Vol. 2 FEBRUARY, 1921 First Copy No. 11

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

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SPECIAL GRADES FOR LINING DIGESTERS
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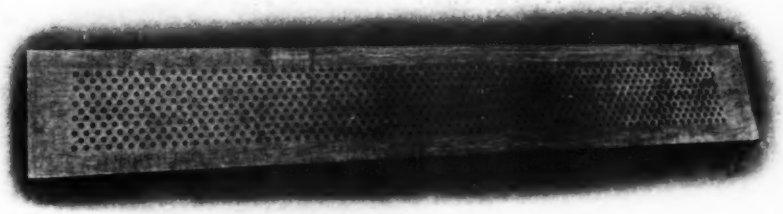
Wood Suction Box Covers



To the Paper Mill Manager

OUR WOOD SUCTION BOX COVERS are drilled from both sides, making perfectly *straight and smooth holes,* also making the surface on both sides *absolutely smooth,* which insures the rubber heads making a good, tight joint, also *increasing the life of the wire.* We have a machine especially designed for making Wood Suction Box Covers in the most *satisfactory* and *economical* manner, and we are prepared to furnish any quantity of Wood Suction Box Covers at a *considerably low cost.*

The Hoffman Patented Couch Roll for Cylinder Paper Machines

A MOST VALUABLE IMPROVEMENT for cylinder machines.
Always soft and in PERFECT CONDITION.
INCREASES PRODUCT OF MACHINE.
PAPER OF BETTER QUALITY PRODUCED.
Superior to rubber rolls.
ESPECIALLY VALUABLE ON BOARD MACHINES.
OVER 2,000 IN OPERATION.

Booklet Upon Request

The Moore & White Company

Established 1886

Office and Works, North Philadelphia Station, P. R. R.
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Vol. 2—No. 11

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

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a combination of the foremost Ground Wood Pulp and Board mills in Finland, makers of various kinds of boards and dry and wet Brown and White Mechanical Wood Pulp.

Get the most for your money by getting next to our qualities and prices!

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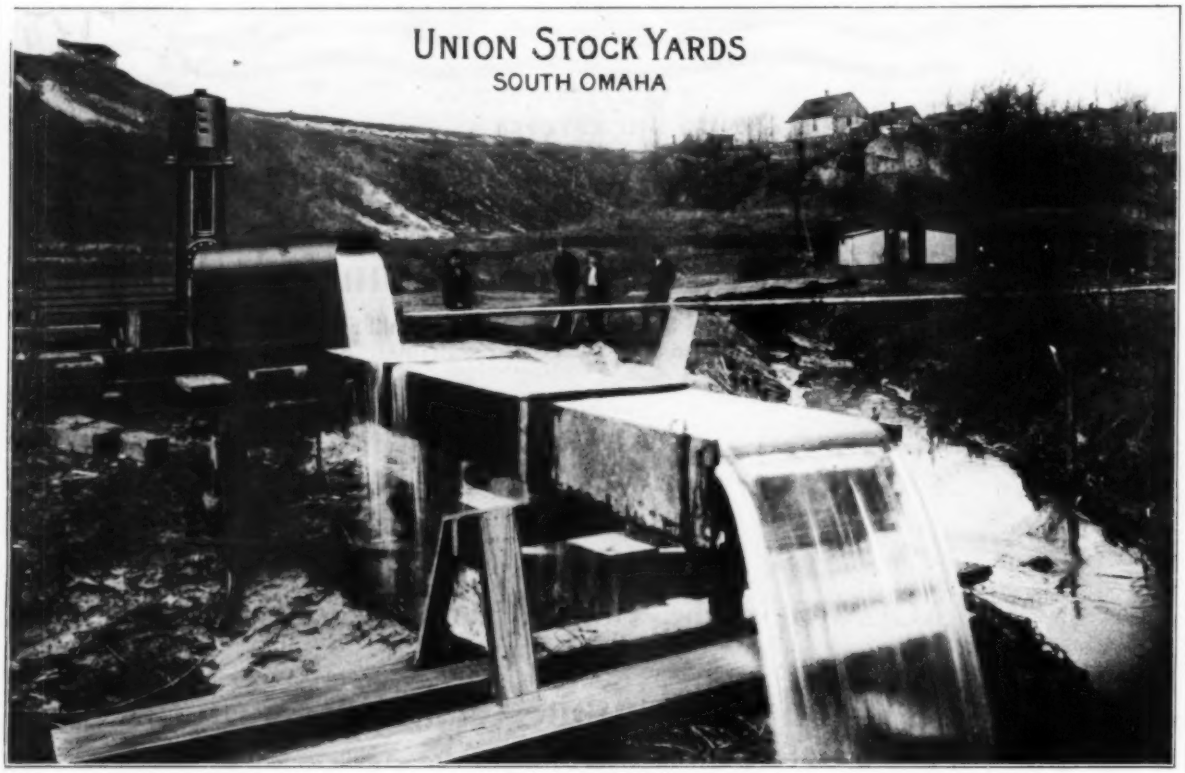
You will never be short of water at Your Paper Mill if you install Gregg Propeller Pumps in your deep wells.

We solved the water problem for the Union Stock Yards, South Omaha. We have solved the water problem for Several Paper Mills and other industries.



You do not need more wells. You need Gregg Propelled Pumps to develop your present wells to their full capacity and give you greater economy.

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GREGG DEEP WELL PROPELLER PUMPS FOR ANY SERVICE
GREGG SEWAGE AND SUMP PUMPS OF ANY CAPACITY
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Now Is the Appointed Time

The present high price of paper is no excuse for waste of materials. Economy in the use of soda places you so much more to the good.

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Investigate Zaremba Equipment at Once

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Our Record for 1920 on Pulp Mill Evaporators

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Sulphite Waste Liquor
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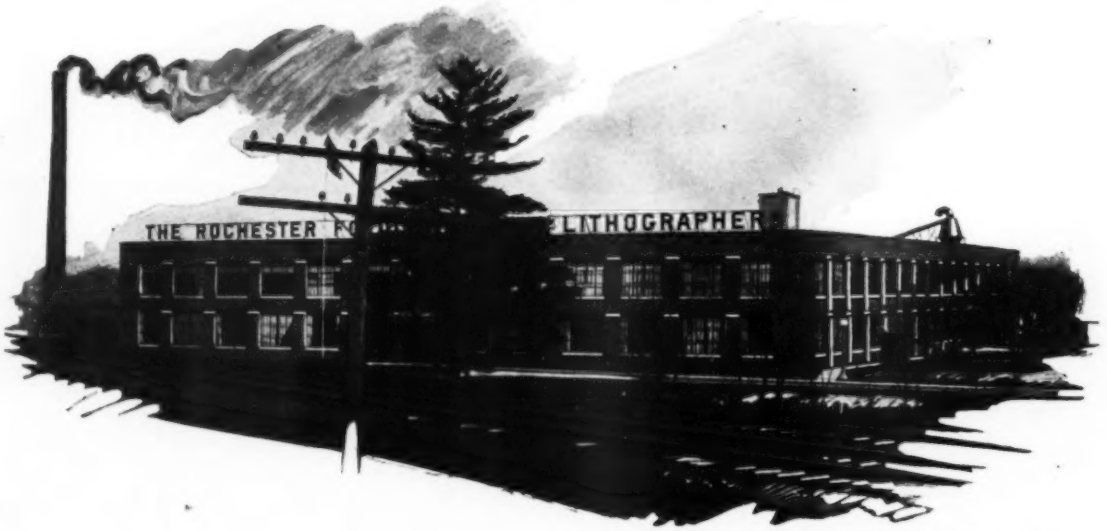
Mead Fibre Co.,
Caustic Soda
Toronto Paper Mfg. Co.,
Caustic Soda

These concerns recognize the fact that Zaremba Evaporators are built for long life, hard service, and no worry to the owner.



The Rochester Folding Box Company, Rochester, N. Y., depend upon Sirocco and A B C equipment to help maintain the high quality of the product.

Materials and Men

The things of standing importance today are materials and men.

The quality of material turned out in your plant has all to do with the reputation on which your business stands.

High quality is only possible with good material and good workmanship. In the Paper Industry quality of the product is improved and the men enjoy better working conditions through the installation of the right type of ventilating equipment—A B C and Sirocco products. The Rochester Folding Box Company, one of the East's most progressive and aggressive firms use Sirocco products for conditioning the air in making folding box board.

This whole subject of ventilating, heating and air conditioning in paper mills is covered in detail in our bulletin in A B C Equipment for Paper Mills. Would you like a copy?

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DETROIT MICHIGAN

"Sirocco"
TRADE MARK

Driven side of "A B C" air conditioning apparatus and outlet for distribution of conditioned air.

A New Type of Safety Valve

THE Horkman Improved Valve is equipped with removable and renewable seat which may be taken out without removing valve from digester.

Carried in 8, 10 and 12 inch sizes

Blueprints and Specifications furnished upon application

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Manufacturers of Bronze, Brass and Iron Castings

NEENAH, WISCONSIN

Heavy Duty White Truck owned by the Miami Paper Company, West Carrolton, Ohio

WHITE Trucks hold their position of leadership in the truck industry simply because they do the most work for the least money. Business needs that kind of machinery now more than ever.

THE WHITE COMPANY
CLEVELAND

White Trucks

---- and at the Liggett & Meyers Co.

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A Fact:

YOU'VE read how noted people at prominent places smoke "Fatimas". You've been convinced that "Chesterfields", tho mild, do—"satisfy".

Now read how noted concerns like the Liggett & Meyers Co. use Tropical Paint and Oil Co. products. Convince yourself that their high quality "satisfies" these men who know.

It's not surprising! Tropical products are the result of years of specialization in protective and decorative coatings for industrial uses. Special formulae have been perfected for every surface and condition. High ideals have maintained a constant and exceptional quality.

Let one of our specialists analyze your paint requirements. His suggestions will prove of value. It will not obligate you in any manner.

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TROPICAL

Paints—Enamels—Roofing Materials

"National" Dyes are National Assets

NATIONAL U.S.A. DYES

Dyes for the Paper Trade

"National" manufactures a full line of dyes adapted to all branches of paper coloring.

National Acid Dyes
Bright and Fast

National Basic Dyes
Of good tinctorial power

National Direct Dyes
Meeting all requisites of shade and fastness

The Technical Service of the Company is at the disposal of paper makers. We are glad to cooperate in solving any coloring problems without obligation.

National Aniline and Chemical Co. Inc.
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Quality

Pulp Used in U.S. and a Tariff on Pulp

AMONG the many great questions concerning the industrial welfare of our nation which are being considered by Congress and the State Legislatures at the present time, the matter which probably more directly and immediately interests the manufacturers of pulp and paper in this country is the tariff on paper which is now being heard before the Ways and Means Committee of the House of Representatives.

Believing it to be of most importance that our industry should have accurate and dependable knowledge on which to base their opinions, we are reproducing in part a letter sent out by the American Paper and Pulp Association to its members which deals with the pulp situation:

"There seems to be some misunderstanding as to the amount of pulp produced in this country as compared with the amount of pulp brought in from Canada and Europe. Definite facts are the only sound basis for conclusion as to future supplies of pulp for the paper industry of the United States.

"The Secretary of the Pulp Manufacturers' Association, Mr. H. H. Bishop, was asked to prepare a statement on the amounts of mechanical and chemical pulp manufactured in the United States and imported from other countries. The following paragraphs are taken from the letter addressed to this Association by Mr. Bishop:

" 'As requested by you, I give below a statement of the amounts of mechanical and chemical pulp manufactured in the United States and imported from other countries:

	Mechanical		Chemical		Total	
Year	Made	Impt'd.	Made	Impt'd.	Made	Impt'd.
1899	586374	.....	593151	.....	1179525	.....
1904	968976	.....	952792	.....	1921768	.....
1907	.....	.....	.....	.....	2547879	.....
1908	.....	.....	.....	.....	2118947	.....
1909	1179266	142989	1316257	224661	2495523	367650
1910	.....	226189	.....	278926	2533976	505115
1911	.....	267089	.....	299330	2686134	566419
1912	.....	185802	.....	354346	.....	540148
1913	.....	170493	.....	373566	.....	544059
1914	1293661	217580	1571896	458154	2893160	675734
1915	.....	178535	.....	382801	.....	561336
1916	1508139	262618	1926862	421165	3435001	683778
1917	1535953	279071	1973986	398369	3509939	677440
1918	1364504	185527	1949357	392691	3313861	578218
1919	1449799	202612	1934969	433807	3384768	636419
1920 Est	1550000	200000	2250000	550000	3800000	750000

" 'As a further matter of interest, we have calculated the percentage of Production and Importation so far as it is possible from the above table, from which you will note that the percentages, while they have varied slightly from year to year, are reasonably consistent and indicate that about 1/6 of the pulp used in the United States come from outside sources.

Percentages of Production and Importations of Pulp Used in the United States

	Mechanical		Chemical		Total	
Year	Made	Impt'd.	Made	Impt'd.	Made	Impt'd.
1909	89.2	10.8	85.4	14.6	87.1	12.9
1914	85.6	14.4	77.5	22.5	81.1	18.9
1916	85.	15.	82	18.	83.4	16.6
1917	84.6	15.4	83.2	16.8	85.1	14.9
1918	88.	12.	83.2	16.8	85.1	14.9
1919	87.7	12.3	81.7	18.3	84.2	15.8
1920	88.6	11.4	80.4	19.6	83.5	16.5

" 'Your attention is particularly invited to the very great increase both in manufacture and in import of pulp during the year 1920, when the entire Paper Industry was enjoying an abnormally large business. The fact that the United States produced in the year 1920, under these favorable circumstances, 3,800,000 tons of pulp of all kinds, and that the consumption of pulp during the years 1918 and 1919 (reasonably normal years) averaged 3,850,000 tons, it became self evident that the United States actually possesses sufficient pulp making capacity to very nearly meet its requirements in normal years, and that with very little encouragement production might be increased to a point where it could supply the entire demand and have a surplus. It is with a view of obtaining this encouragement that we are asking for a revision of the existing tariff, which places pulp upon the free list, and that duties be imposed as follows:

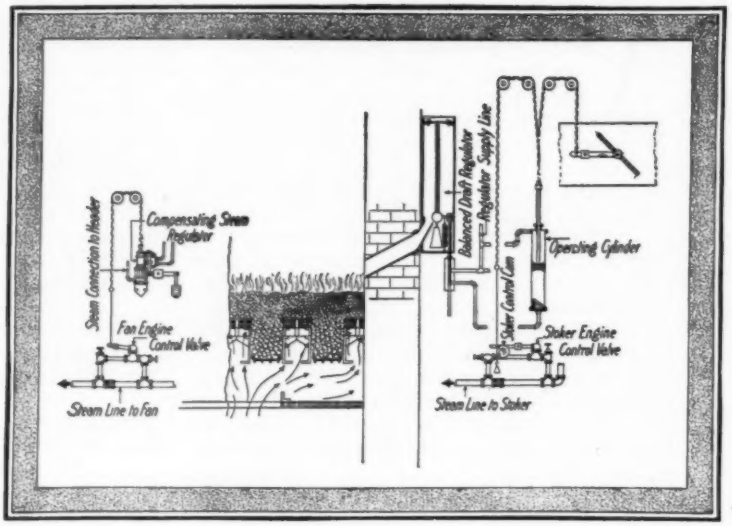
Mechanical Pulp..... 1/10 of 1c per lb.
Unbleached Chemical Pulp..... 2/10 of 1c per lb.
Bleached Chemical Pulp..... 3/10 of 1c per lb.

" 'The effect of the imposition of such duties would, in our opinion, be to encourage further production of pulp in the United States for the reason that United States manufacturers would then be upon a more nearly equal basis with Canadian and Scandinavian manufacturers, whose advantage from both the standpoint of raw material and labor is certainly greater than the small duty suggested.' "

MODERN PRACTICE in COMBUSTION CONTROL

No. 2

Automatic Control of Fuel Feed



THE essential differences between the three recognized methods of automatic stoker control trace to the respective sources from which the control is taken.

Any system in which plant header pressure is the governing function for stoker feed, is open to the obvious criticism that it cannot take into account the inevitable differences between individual fires. All are fed alike, regardless of variations in the thickness or density of the fuel beds.

A system controlled by undergrate air pressure as the operating function may or may not be open to the same objection, according to whether the control is group or individual. But even if the stoker speed for each furnace is governed individually, this system aggravates instead of correcting abnormal conditions of thickness, thinness or density of the fuel bed.

The one furnace function which can be relied upon under all conditions to indicate the fuel requirements of each fire, is the rate of consumption itself. When the overgrate pressure resulting from varying rates of combustion is maintained constant by automatic damper movement, as in the case of the Balanced Draft System, the operation of this control becomes the correct source of regulation for fuel feed.

The Balanced Draft System operates correctly to equalize the load upon all of the boilers on the line, by driving the slower fires, by speeding the rate of feed to the thin beds and by reducing the rate to fires which are too thick or too dense. It also permits easy manual changes to meet load variations.

The theory of Balanced Draft, the apparatus used, how it functions and its almost unbelievable fuel and labor savings make up a most interesting story. "Modern Practice in Combustion Control" is a complete explanation of all that is recent in combustion practice. Write for it today.

The Engineer Company

17 Battery Place **New York City**

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Produced exclusively by The Engineer Company

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PITTSBURGH
Jenkins Arcade Bldg.
ST. LOUIS
Railway Exchange Bldg.
WILKES-BARRE
21 Bennett Bldg.

Turner Baffle Walls
Produced exclusively by The Engineer Company

They stay gas tight and can be built at any angle.

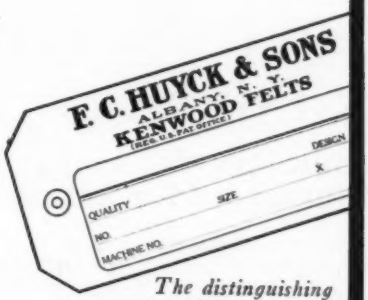
Installed without disturbing the boiler setting they give the correctly tapered pass, eliminate dead spaces, increase heating surface and insure correct gas velocity.

"The Development of an Idea" tells about them. Yours for the asking.

Sunlight floods this department where experts go over the fabric inch by inch for possible weaving errors or other imperfections

Light — clear, penetrating sunlight — stands guard between imperfections and Kenwood Felts and Jackets.

SPACIOUS windows flood every department of the Kenwood Mills with light. In the burling room, where felts are examined for imperfections, this clear lighting is essential. The woven fabric, which has not yet been felted, is draped over a framework or perch which places the material to be examined between the inspector and the light. This inspection discloses knots which must be untied, imperfect threads which must be replaced and close places which must be spread uniformly. These corrections are made at the tables which have been designed especially for that purpose. When these changes have been completed the felt is again placed upon the perch where it is gone over, inch by inch, in order to see that it is ready to leave this department. Such care is expensive, naturally, yet this thorough attention in the end eliminates faulty work in Kenwood products and saves the paper mill endless expense and annoyance.



The distinguishing mark of Kenwood Felts

F. C. HUYCK & SONS
Albany, N. Y.
FELTS AND JACKETS

HOW KREOLITE FLOORS MET THE "ACID TEST" OF THE PAPER INDUSTRY

—22,000 sq. ft. Giving Splendid Service in the Plant of The Richardson Paper Company, of Lockland, Ohio

No type of manufacture exacts greater penalties frm its floors than the paper industry.

Its problems are many and vital.

The weight of the product, the smoothness required to move it expeditiously and economically, the acid reaction which must be continually resisted, all enter in.

Yet, after many other floors failed hopelessly, Kreolite Floors met the test in a way that was altogether satisfying and permanent.

Under the direction of our factory Floor Engineers, Kreolite Floors were installed without interfering with the regular operation of the plant.

The claim that Kreolite Floors are so enduring that they actually "outlast the factory" begins to take a deeper significance as applied to this particular branch of industry.

The reason underlying the peculiar fitness of Kreolite Wood Block Floors for factory purposes and other surfaces where wear and tear must be mastered, is found in our own patented process of thoroughly impregnating the well seasoned, carefully selected blocks, making them proof against decay and disintegration.

Then they are laid so that only the tough end grain is exposed to wear.

The experience of the Richardson Paper Company, of Lockland, Ohio, shows the peculiar suitability of Kreolite Wood Block Floors to the most severe conditions.

After discouraging trials with almost every kind of flooring, a trial strip of Kreolite Floor was installed.

In the winter of 1917-18, 22,000 sq. ft. of Kreolite End Lug Side Groove Blocks were laid in the midst of production.

A letter from Mr. L. Bashwiner, Supt. of the Box Department, written to Mr. T. J. Mullin, General Superintendent of the Company, expresses how well Kreolite Floors stood the test.

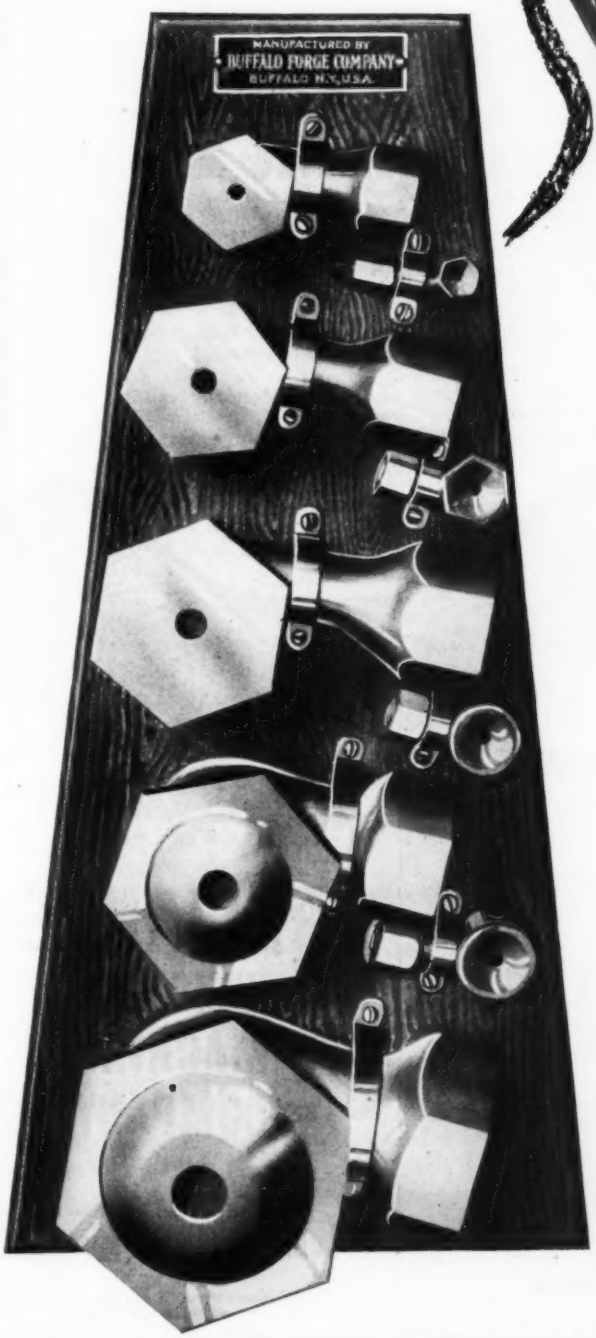
The letter says in part: "I beg to inform you that the Kreolite Wood Block Floor that we laid throughout our press room last fall makes a very desirable floor. We surely hit the nail on the head when you recommended Kreolite Wood Block."

Kreolite Wood Block Floors are especially adapted for use in machine shops, foundries, warehouses, loading platforms, area ways, roundhouses, paper mills, tanneries, stables and garages.

A request will bring our book on Kreolite Factory Floors. It contains valuable information for construction engineers, architects, industrial executives and others facing floor problems. Send for it today without any obligation.

THE JENNISON-WRIGHT COMPANY, 63 Kreolite Bldg., Toledo, Ohio

Prevent Fires in Your Pulp Wood Piles



COSTLY fire losses in Pulp Wood piles can be prevented by keeping the piles under a spray of water.

Buffalo Patented Spray Nozzles produce a fine blanket of mist which effectively covers large areas. These Nozzles properly spaced will effectively take care of any condition.

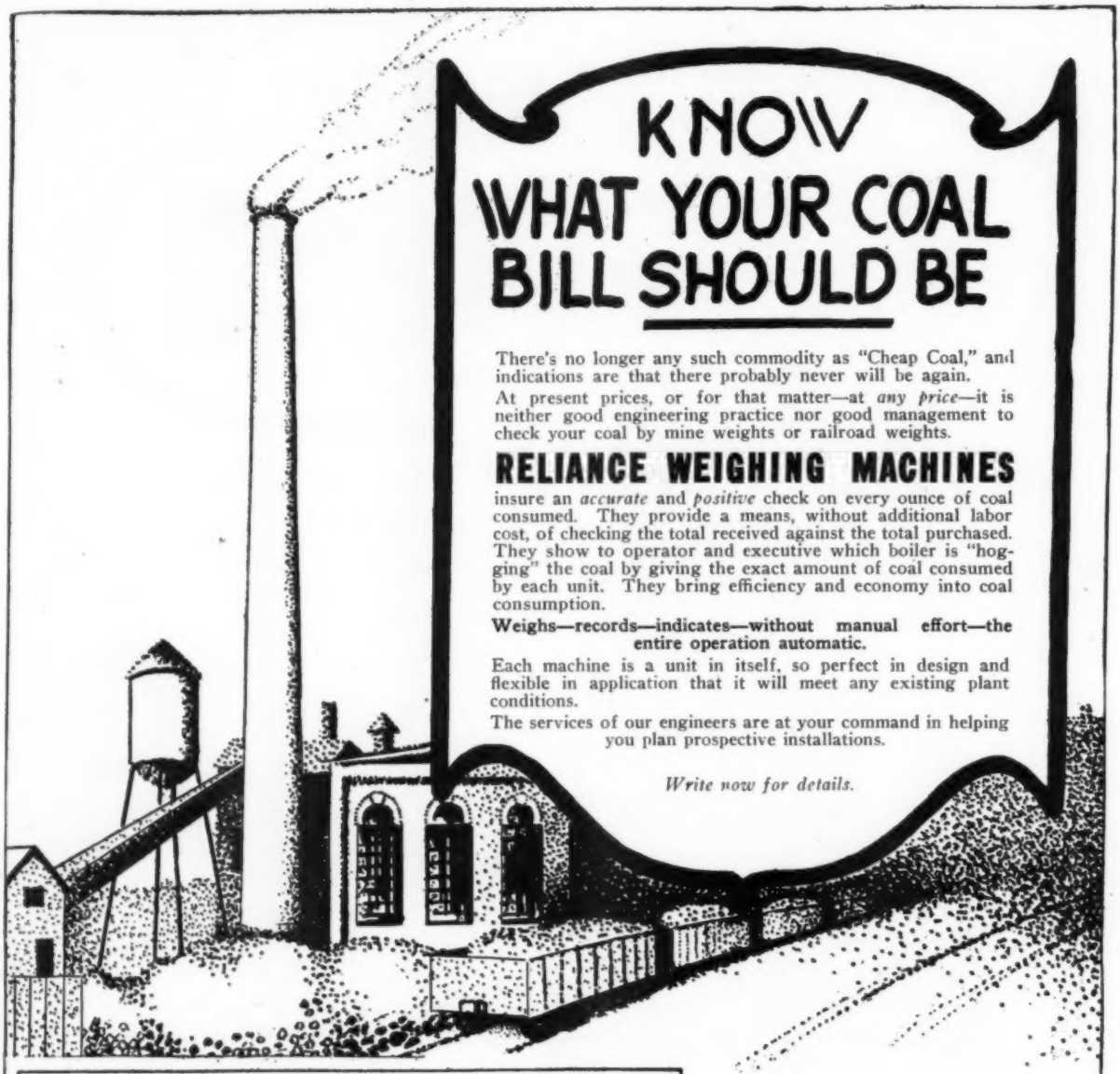
Buffalo Nozzles are simple in construction consisting of only two parts; are inexpensive and have large orifices to prevent clogging. They produce fine sprays under low heads, requiring but two gallons a minute at 20 pounds pressure.

"Buffalo"

Write for Sample Nozzle

BUFFALO FORGE COMPANY

BUFFALO NEW YORK



KNOW WHAT YOUR COAL BILL SHOULD BE

There's no longer any such commodity as "Cheap Coal," and indications are that there probably never will be again.

At present prices, or for that matter—at *any price*—it is neither good engineering practice nor good management to check your coal by mine weights or railroad weights.

RELIANCE WEIGHING MACHINES

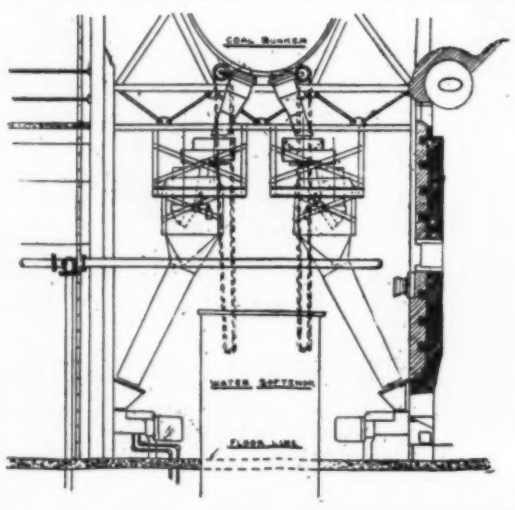
insure an *accurate* and *positive* check on every ounce of coal consumed. They provide a means, without additional labor cost, of checking the total received against the total purchased. They show to operator and executive which boiler is "hogging" the coal by giving the exact amount of coal consumed by each unit. They bring efficiency and economy into coal consumption.

Weighs—records—indicates—without manual effort—the entire operation automatic.

Each machine is a unit in itself, so perfect in design and flexible in application that it will meet any existing plant conditions.

The services of our engineers are at your command in helping you plan prospective installations.

Write now for details.



RELIANCE WEIGHING MACHINE COMPANY

General Offices and Factory

LUDINGTON, MICHIGAN

Representatives in principal cities United States and Canada

Opportunity Plus Industry

By R. L. S.

SUCCESS in life is much more mathematical than the average man is apt to realize, and much more MORAL than he is willing to admit. If Mr. Everyman was to give his estimate of success in the form of a picture, it would doubtless be a mixture of hustle and bustle, combined with lurid high colors, and a generous stack of greenbacks in a prominent position, as the grand finish of his labor. Such a man will commercialize his ideals and shirk his own moral responsibility, while inflating the mistakes of any one who stands in his way.

The man who insists that two times two are five simply shuts himself within the shell of his own convictions. He can reach no one who does not cross their mental wires with his. If men but understood this they would be more careful about choking themselves with their own mental poison. The man who hates or curses his brother is not so much a criminal, as he is an ignoramus. He has to learn that opportunity is forever CONSTRUCTIVE, that it is to achieve, to build, to uplift, and that a destructive process has neither right nor might, except to those who are foolish enough to believe that constructive and destructive elements are equal, either in thought or deed.

It is said that during the panic of '97 a member of the New York Board of Trade met a friend much cast down and asked, "Well, John, what is the trouble?" "Oh, it's no use," was the reply. "I'm down and out, I want work." "Are you sure it is work you want?" "Yes." "Well, you see those rocks up there on the side of the hill. Suppose you go up and roll them down hill, then back up again, and when night comes you will have had a whole day of toil; that is, if you are sure it is work you want." "Yes, but you do not understand me; I want the work to get money. I have not a cent." "Oh, then you are sure it is money you want. Now here is money and you are at liberty to help yourself; the only thing I would ask is that you do not spend it; I shall be so glad to give it, if you are sure that it is what you need." "But," replied the other, "I want the money to buy coal; my bin is empty." "My bin is full," said the other; "go and help yourself. I only ask that you do not convert it into anything else." "That is useless," was the reply. "You must realize that what I actually desire is rest, peace and the comforts of life." "Yes, I do realize it, John, and have only been trying to help you see yourself that toil is not essentially productive employment, that money is not the prime currency of life, and that the possession of material ingredients does not install comfort, which must begin, be enjoyed, and end in the realm of thought."

A dollar in the pocket of a gentleman will purchase more real substance than a million ambitious greenbacks, the last one of which has the same penurious itch for more as had the first. The joy of industry finds its fruitage entirely in the achievement of ideals, and no mistake is more vital, more fatal to the business man than to spell opportunity or industry in terms of dollars and cents.

How much good do you intend to purchase with the life effort you have to spend this year? How much of your higher aims, better morals, more generous appraisal of your fellow man, are you going to seek as the result of self government? This is your opportunity for industrious self improvement. Your salary, whatever it may be, is but expense money for this higher task. And when the year 1921 shall strike a balance, the warmest spot in your breast will not be represented by your bank account, but by better achievements produced from opportunities, industriously met by constructive thought.

MUNISING PAPER COMPANY

MUNISING MICHIGAN

MANUFACTURERS OF

MUNISING M BOND

COLOR QUALITY AND UNIFORMITY
HAVE MADE FOR IT
AN ENVIABLE REPUTATION

Northern Paper Mills

"The Standard of Excellence"

"Northern" Toilet Papers

"Northern" Inter-Folded Towels

"Northern" Roll Towels

CAPACITY 100,000 LBS. PER DAY

NORTHERN PAPER MILLS, GREEN BAY, WIS.

Marathon Paper Mills Co.

Rothschild—Wisconsin

Paper Manufacturers

Carton and Paper Can Stock

Sulphite Bonds
Waxing Papers
Bleached-Specialties

Machine Glazed Plain and Watermarked Specialties

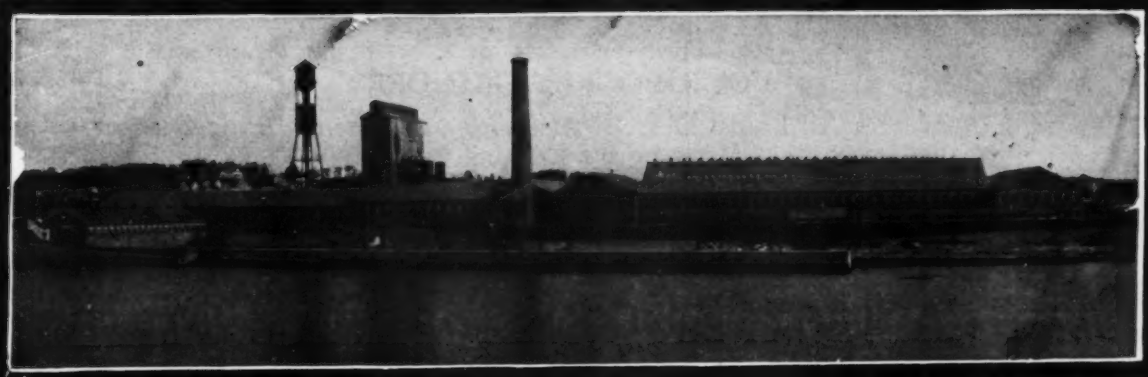
¶ One 100-inch Cylinder Machine, producing Solid Manilas, Single Lined and Double Lined Boards for Carton and Paper Can purposes.

¶ One 120-inch Fourdrinier Machine, producing Sulphite Bond, and Bleached Papers for special conversions purposes.

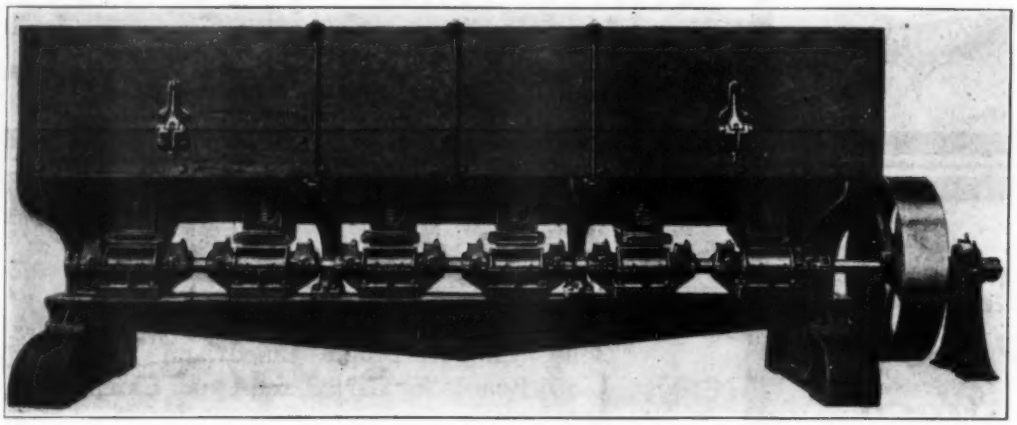
¶ Two 120-inch Yankee Machines, producing Machine Glazed Papers in Plain and Special Stock Designs, as well as Special Watermarks.

Daily Production, 200,000 lbs.

SALES OFFICE
CONWAY BUILDING,
CHICAGO



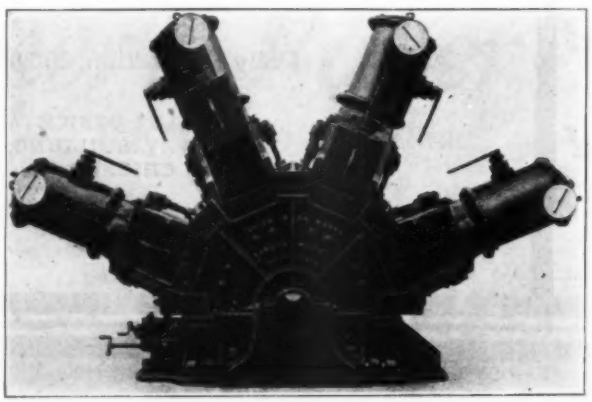
Pulp and Paper Mill Machinery



FLAT SCREENS

Made in All Sizes from 6 to 18 Plates Inclusive

Manufacturers of Screens, 3 and 4 Pocket Grinders, Wet Machines, Disc Barkers, 48″-84″-90″ Chippers, Centrifugal Pumps, Iron, Brass, Bronze and Lead Castings



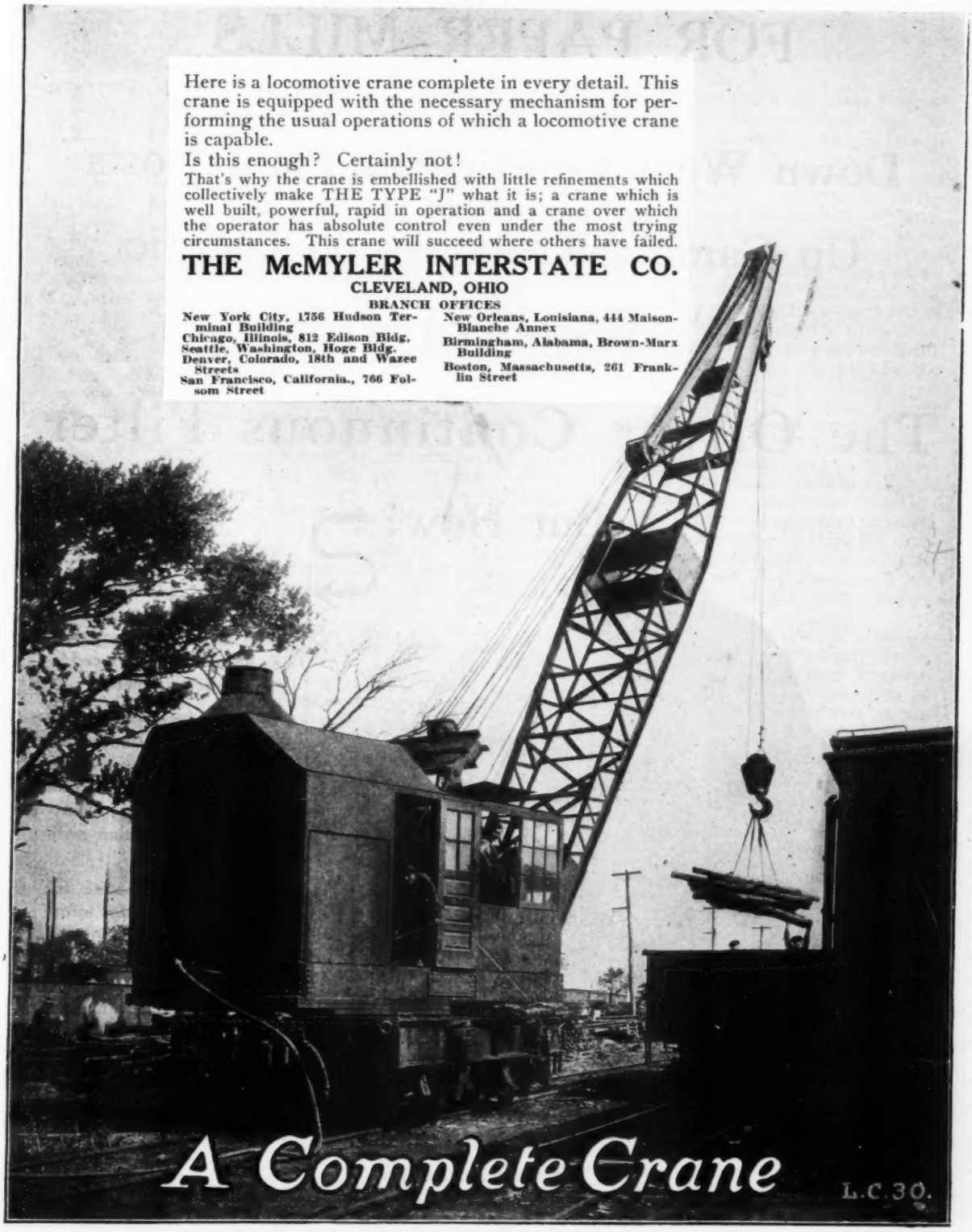
FOUR POCKET GRINDER

Equipped with All Latest Devices, *including our* Patented Pulp Scraper Between the Pockets

INQUIRIES SOLICITED

Union Iron Works, Bangor, Maine

Latest Development in Locomotive Cranes for Handling Coal, Pulp Wood, Etc.


Here is a locomotive crane complete in every detail. This crane is equipped with the necessary mechanism for performing the usual operations of which a locomotive crane is capable.
Is this enough? Certainly not!
That's why the crane is embellished with little refinements which collectively make THE TYPE "J" what it is; a crane which is well built, powerful, rapid in operation and a crane over which the operator has absolute control even under the most trying circumstances. This crane will succeed where others have failed.
THE McMYLER INTERSTATE CO.
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BRANCH OFFICES
New York City, 1756 Hudson Terminal Building
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Seattle, Washington, Hoge Bldg.
Denver, Colorado, 18th and Wazee Streets
San Francisco, California., 766 Folsom Street
New Orleans, Louisiana, 444 Maison-Blanche Annex
Birmingham, Alabama, Brown-Marx Building
Boston, Massachusetts, 261 Franklin Street
A Complete Crane
L.C.30.

Memo:

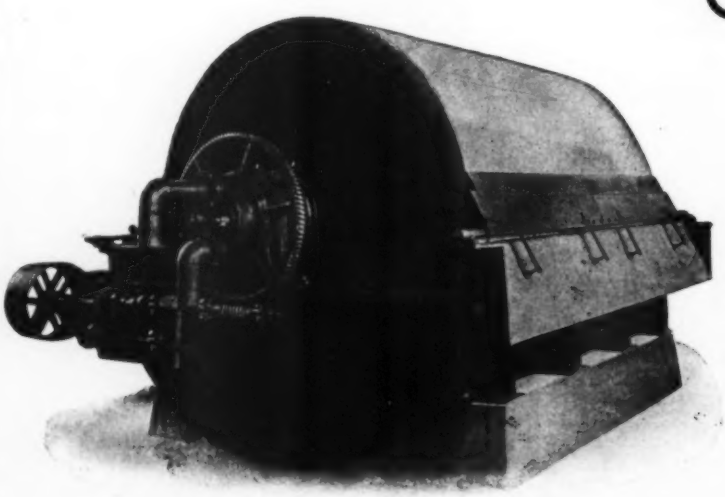
FOR PAPER MILLS

Down Went Causticizing-Plant Costs
AND
Up Came the Savings on Caustic

What Did It?

The Oliver Continuous Filter

But How?



We shall be glad to tell you just how such results were obtained, and in what way they may be similarly produced in your causticizing plant.

The engineering department of the Oliver Continuous Filter Co. is at your service for working out economies in your causticizing department in co-operation with your staff.

Write our nearest office for Bulletin 12-P, and for information regarding the latest developments in economies in causticizing-plant work.

OLIVER CONTINUOUS FILTER CO.

503 Market St.
San Francisco, Calif.

11 Southampton Row
London, W. C. 1

33 West 42nd St.
New York, N. Y.

Cost Association and Business Depression

By T. J. BURKE, C. A.
Sec.-Treas. of the Cost Association of the Paper Industry

"IT'S an ill wind that blows nobody good" is a maxim we have all heard, and one, since I am an optimist, in which I firmly believe. If I said that I was glad that business conditions had changed within recent months, there is a possibility that I should be deluged with letters of protest, and, since my connection with this association is of recent date, that I should be told that I ought to get better acquainted with conditions in the paper industry before forming any definite opinions regarding it. Therefore I will not make any such statement, but it is, nevertheless true, that the necessity for careful revision of selling prices has caused a number of manufacturers to do some serious thinking, and some of them have written me for more definite information regarding the Cost Association—its work and the principles for which it stands. The manufacturers who followed up their thinking by writing me are mostly those who have already investigated the possibilities of cost accounting systems, and therefore understood that a good cost accounting system would enable them to ascertain promptly just what revision each change in the price of any of their raw materials, etc., would enable them to make in their selling price quotations.

The fact that paper manufacturers have been set furiously to **"think"** is a very good omen for the future. "Thinking" is always better than "Talking" unless the latter has been preceded by the former. It seems to me that the paper industry today is in the same position as a man who has been working very hard, gets over-heated, catches grippe and while sick, imagines that he is in a much worse way than he really is. A little careful treatment by a good physician, and the sick man soon gets better. When sick nobody tries to doctor themselves. Then, why try to doctor your business by blindly slashing your prices because the other fellow does? Why not call in a business doctor? Find out why your prices are not right. If the other fellow can manufacture one line cheaper than you can, concentrate on something that you can make as cheap as anybody, or ascertain the reason why your prices are higher than they should be. Get your manufacturing accounting books into as good shape as you have had to get your general accounting books since the Government Tax officials became so inquisitive. A few controlling accounts in the general accounting records will take care of the factory accounting records. The former tell you what **has** taken place —the latter, if properly designed, what **will** take place in your profit and loss account under certain given conditions which your business acumen must determine.

I need not stress the point further, I think, for it is sufficiently obvious today that "Knowledge is Power," and the manufacturer who **knows** the facts regarding his "Manufacturing Cost" is able to arrive at his "Selling Cost," and hence fix his "Selling Price" with a freedom from anxiety, quite foreign to the man who is "forcing the market." He knows just when it will pay him to "shut down" and wait, even after taking into consideration the fact that the organization he has built up is valuable to him. For this reason I strongly urge all manufacturers today to study thoroughly their "Manufacturing Costs.

In an idle moment I once jotted down the following:

Carry **O**n **S**ystematically **T**riumphantly. **S**atisfy **Y**ourself **"S**ystem **T**ells **E**very **M**inute."

That's what we all want to do—"Carry on." The question is "How to do it?" The answer is "By hard work, properly directed" and the only way, I know of, to properly direct a manufacturing concern is to install a cost system which will enable you to eliminate waste and correctly gauge the future. A cost system must be built up to fit the mill. A ready made cost system often hurts as much, and does as much damage, as a ready made shoe. Therefore, we have no ready made cost system. What we have is a number of practical hard-headed paper cost accountants, who can save you many weary hours and much hard earned cash by their advice and co-operation, because they "have been through the mill" and know how. We have recently formed ten separate groups, indicating different manufacturing processes used in making paper products, and intend to standardize, as far as it is practicable to do so, cost accounting procedure in each group. There are a number of points, fundamental to the paper industry, on which decisions will be made by this Association, which will, it is hoped, standardize the cost accounting procedure.

Feeling that the time is now ripe, I shall in the near future, send to our entire mailing list a letter setting forth the principles for which the Cost Association stands, etc., and enclose a membership card. I trust that everyone of these 800 letters will be read and answered, affirmatively or otherwise. I take the liberty of saying this because, in the past, a certain amount of apathy has been apparent in this respect. Remember that one of the principal reasons why the Cost Association exists is a desire on the part of over 100 paper mill executives in this country to help in placing the paper industry in general on an economically sound basis. A most desirable object, and one, which I trust, you will assist us to attain by giving your financial, as well as your moral, support to the Cost Association.

Paint Your Plant Interior at a Saving of 30 to 50 Percent of the Usual Cost

Paint your plant with your own labor, using our paints and our equipment, the latter leased to you for the job on a moderate daily rental basis.

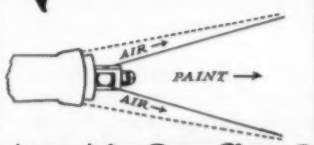
THIS is what Vortex methods do for you without sacrificing quality. Indeed the scores of representative companies who employ our paints and painting equipment are as enthusiastic about the quality as they are about the price.

The big saving is wholly in the item of labor, which is always the heaviest item of hand painting cost. We give better, quicker and cheaper results with our Vortex Painter, which operates on a new principle and covers 1,000 to 2,000 square feet per hour in the hands of an ordinary operator.

Besides saving time and money, the Vortex painter works with little or no scaffolding and with scarcely any interruption of your plant operations.

Now is the time to paint; be ready for the big rush of work that is coming in the next few months. Our representative will be glad to see you and arrange for a demonstration in your plant.

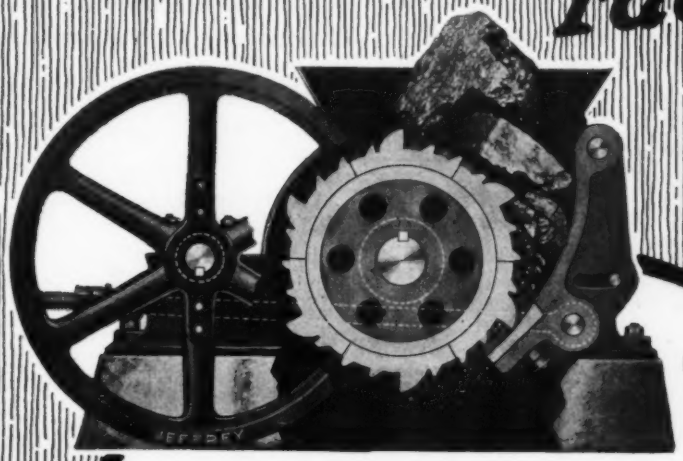
The VORTEX



An Air-Confined Paint Jet
NOT A SPRAY

The VORTEX MANUFACTURING CO · CLEVELAND · O

Power plant efficiency = 100% Factor of Safety = ?



Patented

Your plant may be functioning at top notch speed—there may be close co-operation, scientific management, large output, quick deliveries and everything operating at the highest efficiency. But at the very minute you may be working under a peak load, you suddenly find yourself deprived of a supply of stoker coal and your whole system goes to smash. You have overlooked the Factor of Safety.

A Jeffrey Single Roll Crusher

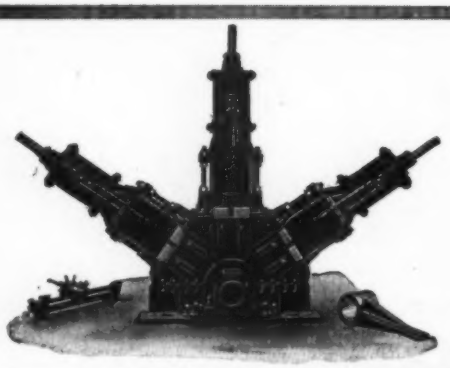
installed in your power plant means a real lasting and dependable Factor of Safety.

It crushes run-of-mine or lump coal to stoker size in one operation and makes your plant independent of Mine, Weather and Traffic Conditions.

Write today for copy of Bulletin No. 141-Y

SHIPMENT FROM STOCK

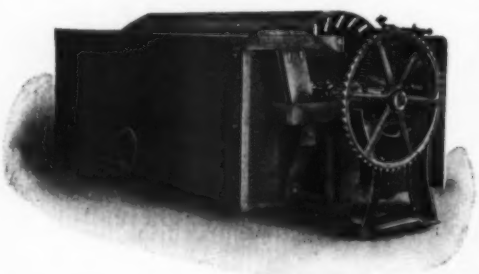
The Jeffrey Mfg. Co.
813 North Fourth Street
Columbus, Ohio



Standard Wood Pulp Grinder

Built in Three Sizes

Taking wood 24″, 30″ or 32″.
Bridge-trees—Are well proportioned.
Flanges—Made of steel, 40″ diameter.
Hydraulic Cylinders—Copper lined, 12″, 14″ or 16″ diameter.
Pillow Blocks—22″ length of bearing.
Pockets—Very heavy and designed particularly for free discharge of pulp.
Service—Continuous distinctive service is always assured.



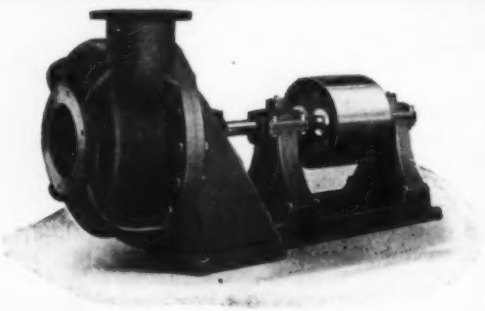
The Wood's Machine

Used as Pulp Thickeners, Savealls, Pulp Washers and Water Filters

ADVANTAGES:

Reduced Wire Costs	No Couch Roll
Enormous Capacity	Minimum Repairs
Only 2 H. P. Required	No Doctor
Works Automatically	Requires No Attention

TWENTY-NINE SOLD DURING THE PAST YEAR



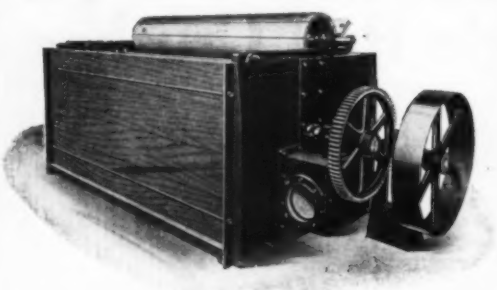
Heavy Duty Paper Mill Pumps

Built Especially for Handling Stock

Impeller—Extra wide, enclosed type and perfectly balanced against vibration and end thrust.

Suction Inlet—Is of large area, giving a free and easy entrance to same.

Our Pumps are economical in use, simple in construction, of very great durability and discharge continuous steady stream.



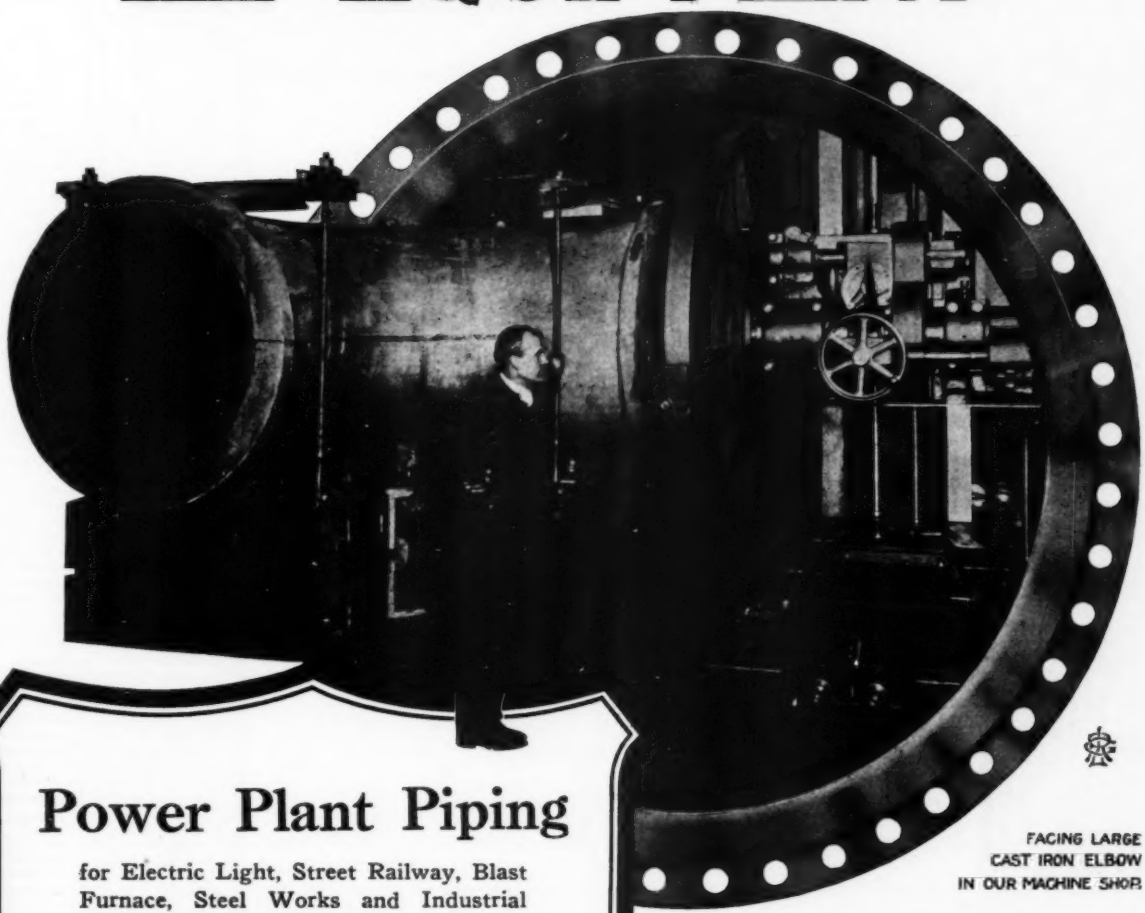
Improved Decker

Single or Double Cylinder Type

Built in the following sizes:
Cylinder mould diameter, 36″ or 40″.
Face of cylinder mould, 72″, 84″ or 96″.
Cylinder mould of best reinforced construction and properly supported with our latest design outside bearings.
Vat furnished either all wood or with cast iron ends.
For Stability and Efficiency our Improved Deckers are Unexcelled

PULP AND PAPER MILL MACHINERY
GLENS FALLS MACHINE WORKS
GLENS FALLS, NEW YORK

PITTSBURGH PIPING AND EQUIPMENT



FACING LARGE CAST IRON ELBOW IN OUR MACHINE SHOP

Power Plant Piping

for Electric Light, Street Railway, Blast Furnace, Steel Works and Industrial Plants of every description.

Specialists in Welded Wrought Steel Headers, Flanged Iron and Steel Fittings, Pipe Bends and Fabricated Piping.

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CHICAGO Peoples Gas Building

INDIANAPOLIS Traction Terminal Building

SAN FRANCISCO Monadnock Building

A modern up-to-date plant +

Highest quality of material +

Long experience as paper machine wire makers +

A dissatisfaction with present attainments and constant effort to improve our product =

"APPLETON WIRES" which are Good Wires

APPLETON WIRE WORKS
APPLETON, WISCONSIN

$300.00 for an Article

Received Between October 1, 1920, and September 30, 1921

THE PAPER INDUSTRY was started with the one idea of being helpful to the whole Pulp and Paper Manufacturing Industry. We believe we have succeeded. At least many people tell us so, but we want to do more in being helpful, so that every man in the industry may know more of his chosen work.

Many men in this industry have valuable ideas that would be worth hundreds, possibly thousands of dollars, for other men to know, and at the same time will not harm the one man that knows it. The old idea of hiding our light under a bushel for fear someone else will learn of something that we may know has passed, and the war was to a large degree responsible for this. It is stated that America advanced more in most of the arts and sciences, as well as manufacturing processes, in the few years of the war period, than it had in fifty years before.

We lose nothing by giving out knowledge. If each of two men have a dollar and each gives his to the other, both will have the same and gain nothing, but if each of two men have an idea, and each gives away that which he has, he does not lose, but each has two, and so if we multiply this by one hundred or a thousand, each man that formerly had only one idea, now has a hundred or thousand, and no one has lost.

So, in order that the greatest number may have the greatest amount of knowledge, and in order to get men to take the time for the proper study and preparation of the right kind of an article, we will give to those who will endeavor to furnish us with real helpful articles, during the next twelve months, the following amounts:

For the best article furnished in this competition, we will give the sum of $300.00.
For the second best article we will pay $100.00.
For the third best article we will pay $50.00.
For the fourth best article we will pay $25.00.
For the fifth best article we will pay $15.00.
For the next thirty-one best articles, we will pay $10.00.
For the next forty best articles we will pay $5.00.

Any one man may write as many articles as he desires, providing they are on different subjects. Each article, however, should fill at least three pages of THE PAPER INDUSTRY.

Several well known men of the industry will be chosen as judges in this competition, their names to be announced at a later date, and the publisher of THE PAPER INDUSTRY will only decide first whether the article is worthy of publishing at all, and if so, then it will take its chance for the $300.00 prize.

In order to make it possible to publish these papers during the next twelve months, papers must begin to come in immediately and the minimum price of $5.00 will be paid for each as they are published, the balance representing the prize money will be awarded after the twelve months period has expired, and the decisions have been made.

Some men feel that they know many good things, but cannot write them down in proper fashion. It will not be necessary that these articles be written to show any great amount of learning, as many men who have had little schooling may be able to furnish the most helpful ideas, and it is something that is helpful that we want; we have an editor for the very purpose of carefully scrutinizing everything before it goes to the printer, so that it may be grammatically and typographically correct.

You can choose your own subject, as there are so many things to be written about in this great industry that we will not even attempt to outline the full list of subjects, but it may be of some plan to get a larger product out of a machine; it may be on the subject of saving in the power plant; saving bleach, dye, or one of many other things; it may be a plan to make the wire or felt last longer; some method of making a better sheet without increasing the cost, or making as good a sheet by reducing the cost; a new idea in the process of pulp making; in fact it can be on any subject that will be helpful to pulp and paper manufacturers, and their employes.

Anyone can try his hand, be he president, manager, superintendent, chemist, engineer, machinery man, foreman, or workman. If some one should feel they cannot write a long article, then write a short one. We will pay for it, if we can use it.

Start NOW and get your article or articles in at the earliest possible time.

Address all articles in this competition to

"Contest,"
THE PAPER INDUSTRY,
356 Monadnock Block,
Chicago, Ill.

XYLITE

The Paper Mill

LUBRICANT

For DRYERS, BEATERS,
GRINDERS, SCREENS,
GEARS, ETC.

Xylite Felt Cleaner for Felts

Xylite Belt Dressing for Belts

G. B. STOCK
Port Huron

XYLITE

Grease & Oil Co.
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LINK-BELT

Double-Duty Wheels for Roller Chain Drives

HERE is a wheel that is built for service and economy. It consists of a *split steel rim section*, in which teeth are cut, attached to a cast iron hub, which is bored and keyseated to order. The hub section can be used indefinitely, and new rim sections added, when renewal is necessary, or it is desired to change the speed ratio.

Interchangeability of all parts is made possible by the use of jigs and fixtures in manufacturing.

Let us tell you more about it.

657

LINK-BELT COMPANY PHILADELPHIA CHICAGO INDIANAPOLIS

Suction Couch and Suction Press Rolls
are recognized standard parts of
modern paper machines

MILLSPAUGH SUCTION ROLLS

MEAN SMOOTH RUNNING
GREATER PRODUCTION
REDUCED LABOR COST

Make Wires Run Longer—Keep Them Cleaner
Guide Easier

Let Us Tell You the Full Story

The SANDUSKY FOUNDRY
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BUILDERS OF THE WIDEST
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MACHINES IN THE WORLD

HARMON SCREENS

Flat and Inclined Type

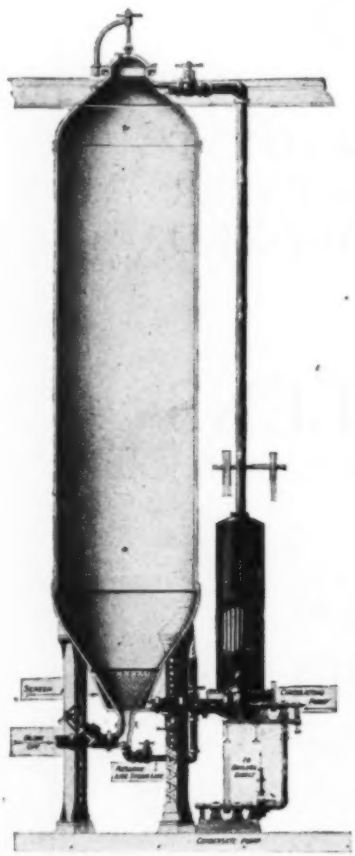
Fan, Centrifugal & Plunger Pumps

Specialists in Rebuilding Old Machines

The
BAGLEY *and* SEWALL COMPANY
WATERTOWN, NEW YORK, U. S. A.

Complete Pulp Plants

Everything for the Manufacture of Soda and Kraft Pulp
Ready for Shipment



It is not the most usual thing in the World, to have a ready made manufacturing plant to take down off the shelf and pass out to the first customer. We have several to offer.

Complete Diffuser and Digester Houses

JK 3100. Five complete digester and diffuser houses, capacity 80 to 100 tons of Kraft pulp (can be split in two units), each house containing 8 digesters, 8 washing tanks, 8 bleaching tanks (wood), and 8 pulp tanks (wood), 4 Blow tanks—one common to 2 digesters—catch tanks, etc. Four hot water tanks (wood) on steel towers outside the building, 6 Caustic tanks and 2 weigh tanks (caustic), elevator, bleach liquor storage tanks, 2 wooden outside storage tanks for black liquor of wood but useless for this purpose if wood pulp is to be made. All the necessary pumps, shafting, pulleys, etc. The whole building is built of steel covered in with galvanized corrugated sheet plate and the apparatus is driven with 2 Nordberg 250 h. p. Corliss engines—non-condensing. The main shaft which stretches the whole length of the building is stepped and rests in ring-oiled bearings on cement blocks. All floors are of wood. These units are most suitable for Kraft pulp manufacture.

NR 2011. One complete digester and diffuser house same as above.

MORTERUD PROCESS — DIGESTERS

SAVE COAL—SAVE TIME

NR 2011 A. Two welded steel plate digesters, 8 ft. in diameter x 27 ft. high. Test pressure, 165 lbs.; capacity, 1,300 cu. ft.; cradles, column, false bottom and heads included. To be sold either with or without Morterud attachment.

BOILERS	CHIPPERS	INCINERATORS	TANKS
BARKERS	DRYERS	PUMPS	COOKERS
BEATERS	EVAPORATORS	PULPERS	GRINDERS
CONCENTRATORS	FILTERS	SCREENS	TURBO-SETS

Let Us Know What You Need—We Can Supply It
Send for Pulp and Paper Section "T. P. ECONOMIST"

TECHNICAL PRODUCTS COMPANY

INCORPORATED

CHICAGO 501 FIFTH AVENUE, NEW YORK TORONTO

EVAPORATORS

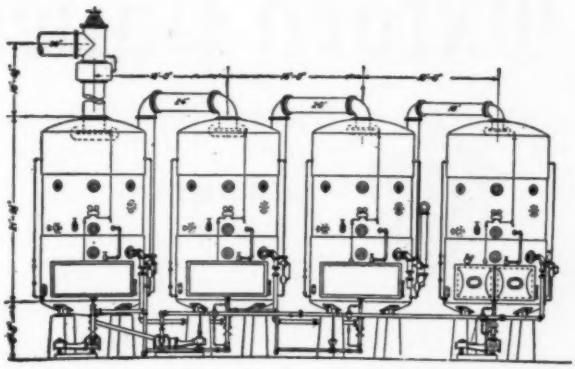
Standard Makes—Designed for Soda Pulp Mills
New Evaporators at Prices Below the Market
Used Equipment at Substantial Savings

Brand New Zaremba Evaporators

JK 3005. One Quadruple Effect Zaremba Evaporator; each effect 10 ft. in diameter and containing 3,000 sq. ft. of heating surface; complete with pumps, liquor testers, liquor and condensate controllers, etc.

JK 3005 B. Same as above, with 3,400 sq. ft. heating surface.

JK 3005 A. One condensing system, consisting of a counter-current barometric condenser and Laidlaw feather valve dry vacuum pumps suitable for both of above evaporators.



Yaryan Evaporators

CG 519. One triple effect Yaryan Horizontal Type Evaporator. Each effect 33″ in diameter, carrying 48 3″x12′ iron tubes expanded into brass tube sheets. Complete with 1 Blake-Knowles wet vacuum pump, cast iron jet condenser, feed and tail pumps, one new Yaryan heater, 450 sq. ft. heating surface, piping, regulators, etc.

Zaremba Evaporators

CG 184 GG. One triple effect Zaremba vertical type evaporator; cast iron shells 60″ in diameter x 13′ 2½″ high, 246 2″ charcoal iron tubes per effect, giving 450 sq. ft. heating surface; complete with 12x36″ jet condenser, American Marsh wet vacuum pump, feed pumps, steam traps, gauges, etc.

CG 184 HH. One single effect Zaremba horizontal type evaporator; cast iron shell, 60″ in diameter x 10′ 7″; 220 2″ charcoal iron tubes, giving 403 sq. ft. heating surface; complete with 12x36″ jet condenser, American Marsh steam vacuum pump, feed pump, steam traps, gauges, etc.

CG 184 FF. One triple effect Zaremba vertical type evaporator; ⅜″ steel plate shells 84″ in diameter x 16′; 522 2″ charcoal iron tubes per effect, giving 1,044 sq. ft. heating surface; complete with 2 jet condensers, 2 American Marsh steam vacuum pumps, feed pumps, steam traps, gauges, etc.

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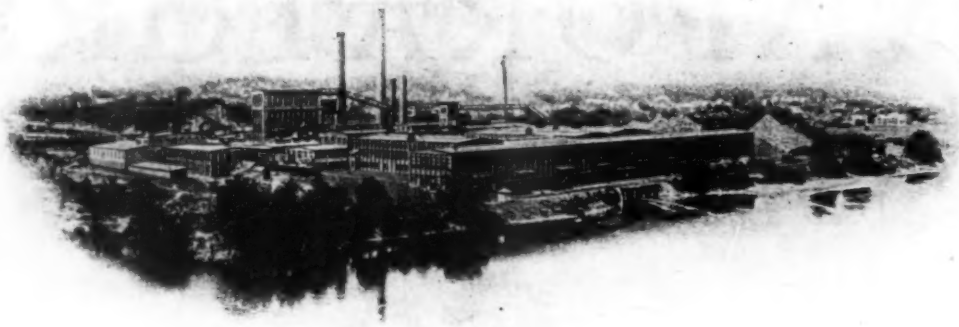

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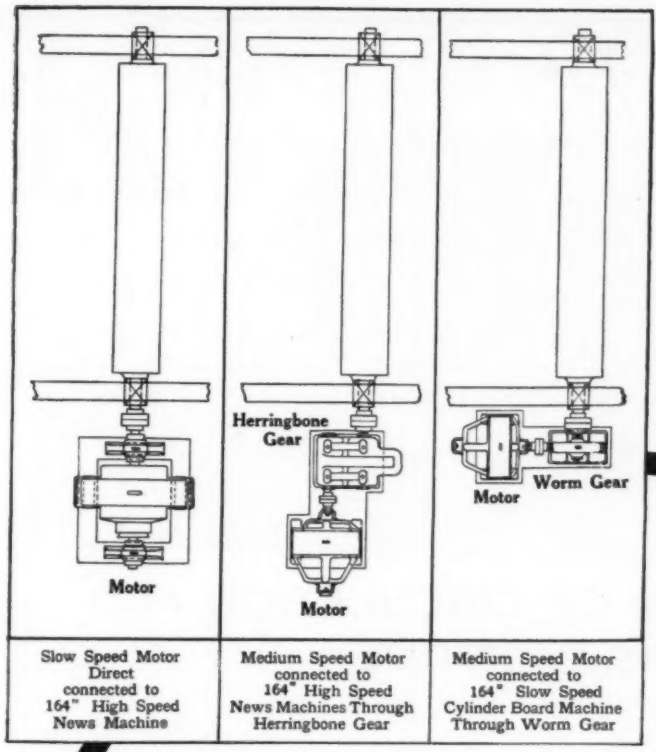

Slow Speed Motor Direct connected to 164" High Speed News Machine	Medium Speed Motor connected to 164" High Speed News Machines Through Herringbone Gear	Medium Speed Motor connected to 164" Slow Speed Cylinder Board Machine Through Worm Gear

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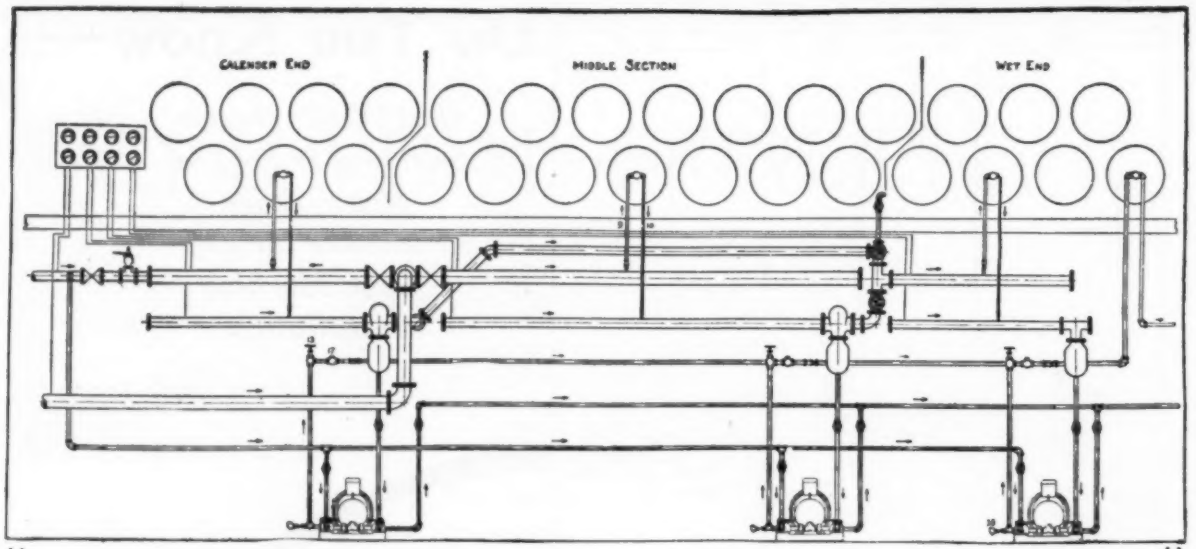

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Saves Coal in Paper Mills and Increases Production

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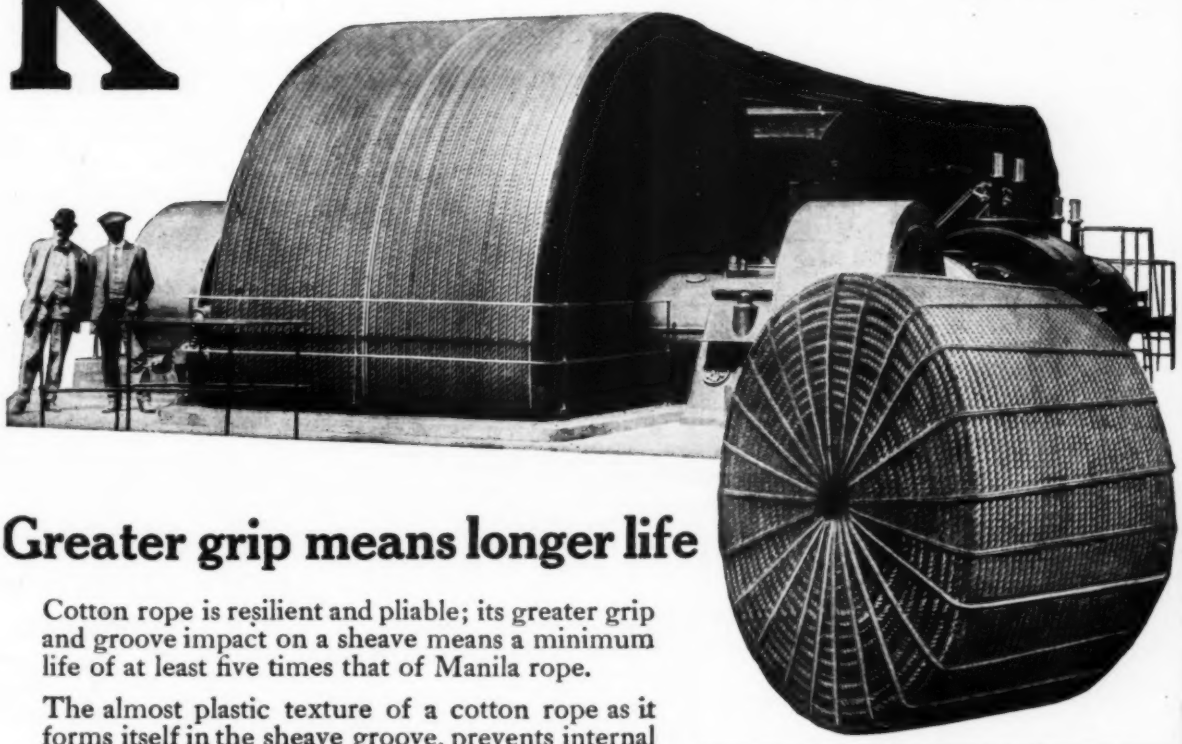

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England has long recognized the superiority of cotton rope for rope driving; most English woolen and cotton mills, rope factories and steel working plants are using the Kenyon Interstranded Rope exclusively.

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A text book on rope driving, as developed in England in the last decade, is being reprinted for distribution, this very complete analysis of the subject should be in the hands of every engineer in America. We will send you a copy as soon as it is off the press if you say so.

	DIAMETER OF ROPES								
Velocity in feet per minute	½"	5/8"	¾"	⅞"	1"	1¼"	1½"	1⅝"	1¾"
1000	4	6	9	12	15	19	24	28	34
2000	4½	7	10½	14	18	23	28	31	37
3000	5½	8½	12½	17	22	28	32	36	40
4000	.....	.....	14½	20	26	32	36	40	46
5000	.....	.....	.....	23	30	38	43	48	55
6000	.....	.....	.....	.....	35	44	52	58	68
7000	.....	.....	.....	.....	.....	.....	62	70	84

The table above will be of interest to engineers—it demonstrates the advisability of using small ropes for high velocities rather than heavier sizes and larger size pulleys.

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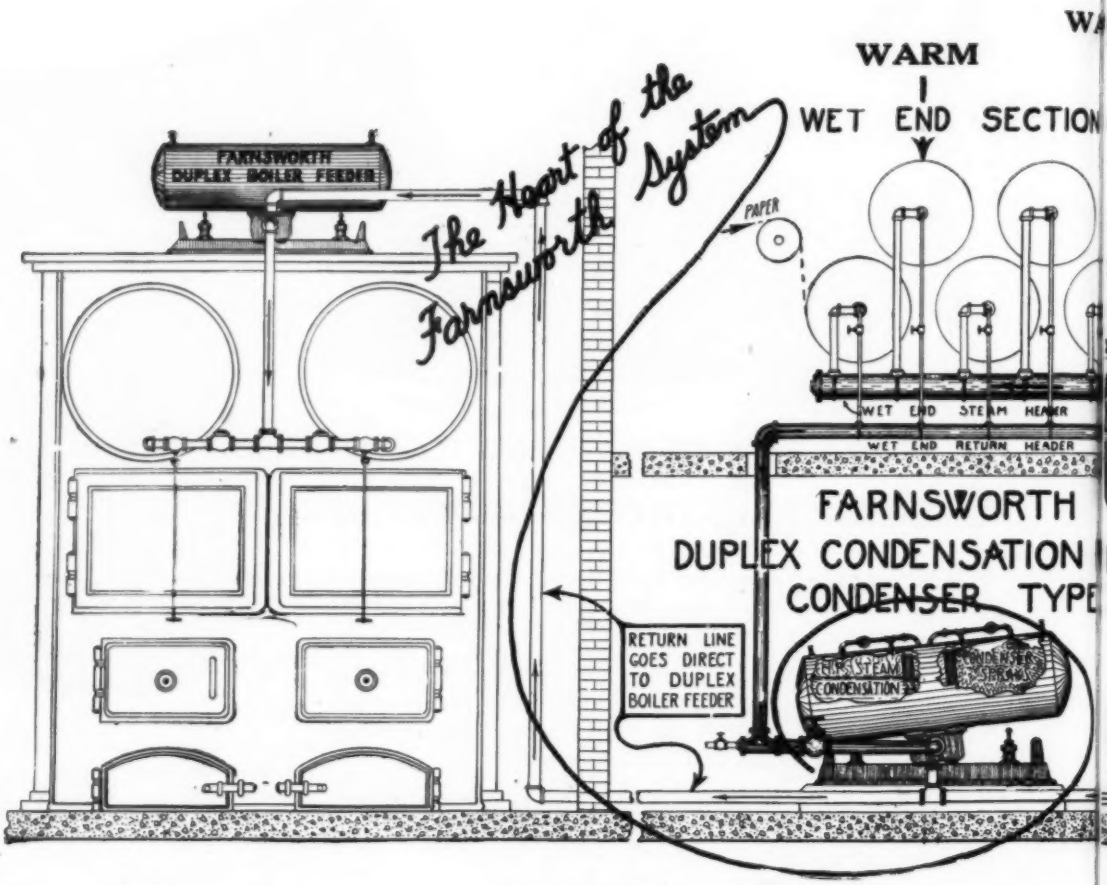

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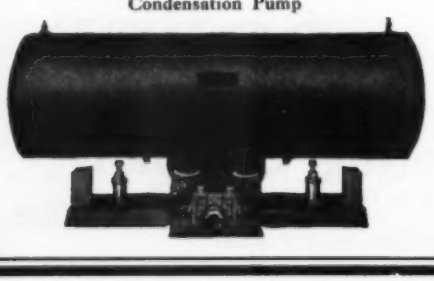

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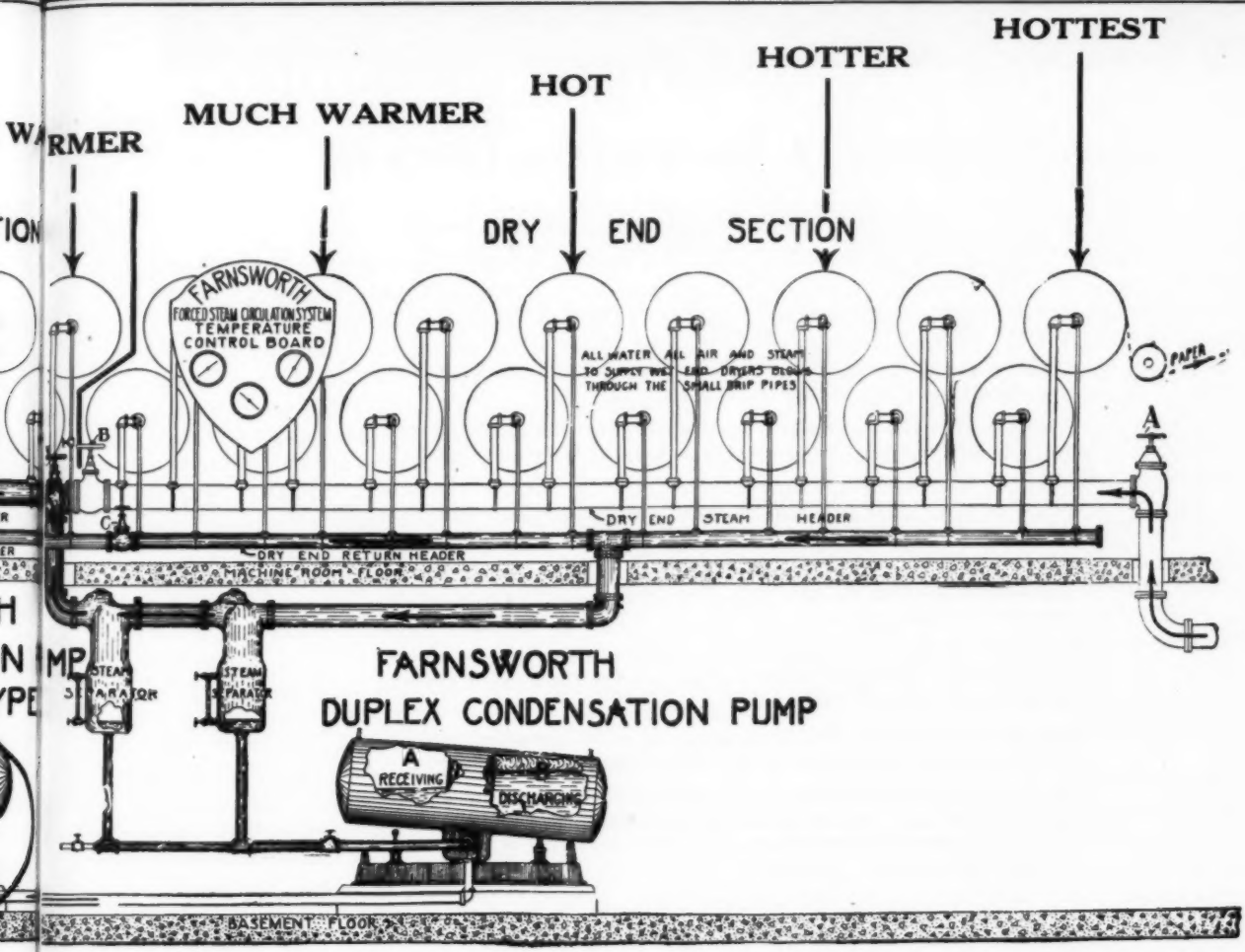

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AM CIRCULATION SYSTEM SAVES COAL
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Greater Production

Farnsworth Duplex Condensation Pump
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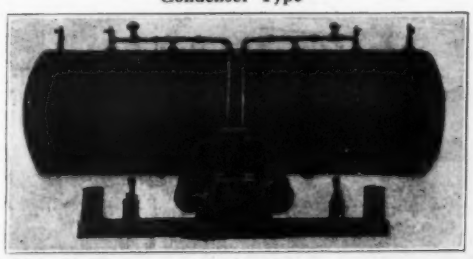

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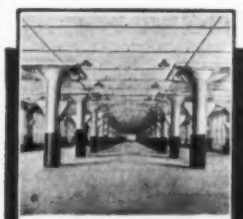

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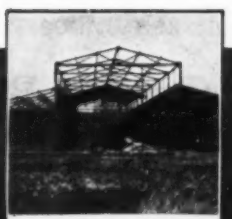

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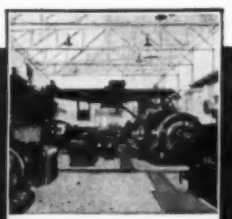

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Continuous Filtration of Lime Mud in Manufacture of Caustic Soda

By H. A. MORRISON

SODA and sulphate mills require a clean and efficient means of separating caustic liquor from the lime carbonate precipitated in causticizing. This sludge must be dewatered as far as possible before the precipitate is either removed as waste, reburned to quicklime, or sold for any of its varied uses.

In order to accomplish this efficiently, a filter must have the following characteristics:

(1) Complete resistance to alkali; (2) effective recovery of the caustic with least possible amount of wash water; (3) large capacity per unit of filter area; (4) preferably automatic and continuous action; (5) inexpensive repairs and few renewals; (6) results of a uniform character.

The various methods of washing and disposal now in use are:

(1) Intermittent settling and decanting; (2) continuous counter-current thickening and washing with mechanical discharge; (3) filtration by pressure filters, such as plate and frame or semi-automatic presses; (4) filtration and washing on vacuum filters; (5) combinations of one or more thickeners followed by one or more filters.

Settling and Decanting

Settling and decanting require large tanks, much labor, and the solids finally discharged are a wet, pasty mass containing upward of 60 per cent moisture. This method can be practiced only when sludge is flushed to waste. Caustic losses are always great and operating costs excessive.

Counter Current Washing

The practice of continuous washing in counter current thickeners with mechanical discharge has one point of advantage; namely, low labor costs; but losses of alkali are erratic. Even in the best operated installations, the underflow from the last thickener is at times abnormally high in caustic. The discharged sludge is never less than 50 per cent moisture, while the average is at least 60 per cent, so that it cannot be stored or handled except as a liquid. The apparatus occupies fully as much floor space as the intermittent Settling and Decanting system, and the necessary building outlay is at least 5 times as much as when filters are used.

Pressure Filters

The first cost of plate and frame presses is somewhat less than that of either a Counter Current Washing plant or Vacuum Filters, but excessive cloth consumption, enormous labor costs and the disadvantages of intermittent operation, put them, for a modern paper mill, quite out of the question. An automatic Vacuum Filter will use less wash water and discharge equally dry cake, with an operating and maintenance cost of from 80 to 85 per cent less than that of plate and frame presses.

The type of pressure filters whose several leaves or frames are enclosed in a single housing represents a half-way stage between the antiquated plate and frame presses and the modern automatic Vacuum Filter.

Installation costs on such machines are uniformly higher, power consumption is greater, and more wash water is used than on the Vacuum Filter, although the discharged cake on pressure filters frequently averages less than 0.5 per cent contained alkali, based on dry weight, and the results are fairly uniform when the filters are properly operated.

Labor and cloth costs are approximately double those of the vacuum filter.

Compared with settling and decanting, less wash water is needed but washing is done under a disadvantage; since the water is applied under positive pressure, it seeks out passages of least resistance, such as cracks in the cake, thus causing uneven washing.

These filters have revealed numerous mechanical disadvantages in operation, which seriously limit their application.

Vacuum Filters

Vacuum Filters, best represented by the revolving drum type, seem destined to supplant all other means of washing and dewatering lime sludge. Careful investigation shows that they meet all of the basic requirements outlined above. They are built entirely of steel or cast iron, and woven monel metal filter cloth with monel wire winding is employed. Alkaline loss is reduced to about 0.2 per cent sodium hydroxide (NaOH), based on dry weight of lime cake. This remarkable recovery of valuable alkali is accomplished by the use of only 4 parts of wash water to 1 part of solids. When operating on lime sludge containing 30 per cent insoluble lime carbonate ($CaCO3$), a drum filter having 100 sq. ft. area will discharge about 25 tons dry weight of cake in 24 hours, containing from 38 to 40 per cent moisture. These filters when properly installed and when given uniform feed will operate without more than casual attendance and function perfectly during an entire day without any adjustment. All parts are slow moving and perfectly resistant to alkali, so that repair and renewal costs are

at a minimum. Drum filters can be depended upon to give uniformly satisfactory results as long as proper conditions are maintained.

The choice of filter equipment for lime sludge can be made only after closely inspecting all of the better known types of filtration machines, keeping in mind (1) the cost of installation, (2) operating and upkeep

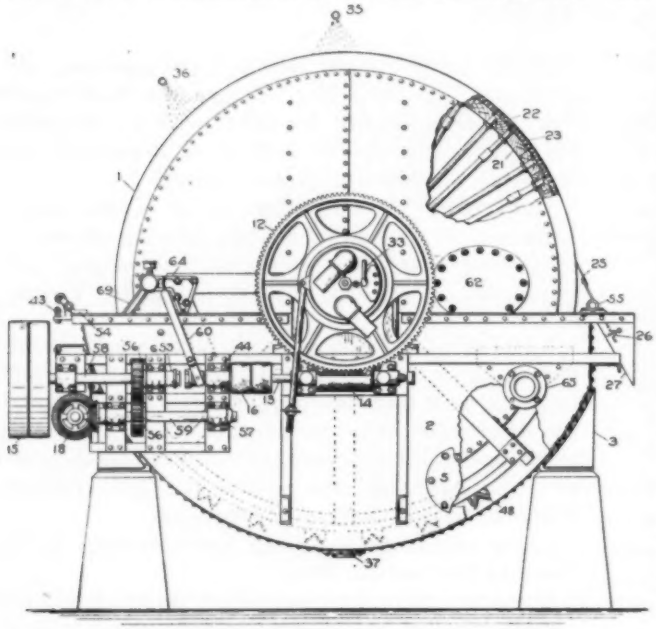


Figure 1

charges, (3) efficiency and dependability, (4) highest recovery of caustic.

Many paper-mill operators are unfamiliar with continuous automatic vacuum filter application to paper making, and for their benefit the following brief description is written:

Referring to Figures 1 and 2, it will be seen that the filter consists of a steel drum or cylinder, supported at each end on trunnion bearings, and revolving partially submerged in a steel filter tank which is equipped with a mechanical agitator for maintaining uniform pulp mixture in the filter tank. Fig. 3 illustrates the filters connected to the vacuum system. If one filter only is used, cake is not repulped, but is delivered direct to the lime burners or waste from the primary filter.

Lime carbonate sludge from the causticizing tanks, containing from 15 to 20 per cent sodium hydroxide at from 150 to 175 degrees Fahrenheit, is delivered into the filter tank at a uniform rate, being kept homogeneous by the agitator. The dry vacuum pump draws air and solution through the monel metal filter cloth, with which the cylinder is covered, and out through the vacuum pipes which lead from the individual sections into which the drum-surface is divided. During all the time that a given section is submerged, caustic liquor is being drawn through the cloth and out through the automatic filter-valve into receiver No. 1, and the solids which this liquor contained are deposited in a layer approximately three-quarter inches thick upon the outer surface of the cloth. With a heavy sludge, the vacuum on this portion of the cycle is regulated by a vacuum-regulating valve, so that the cake formed is of such a thickness that it can be most efficiently washed. Height of pulp level in filter-tank, speed of drum, temperature of sludge, concentration of solids in the sludge, and quality of lime used, are other factors which determine cake thickness. After emerging from the pulp, the cake rapidly loses strong liquor until, on account of shrinkage, it is at the point of cracking. Just at this time, hot wash water is applied by means of atomizing sprays which distribute the wash uniformly over the cake as it passes under them. An adjustable parting-bridge, or stop, in the automatic filter-valve diverts the weak solution coming through the cake after washing starts through outlet B to receiver No. 2. On strong caustic 3 lines of atomizing sprays are commonly used and these are often followed by a drip pipe. The amount of wash water is dependent upon the alkalinity of the sludge being filtered. To wash

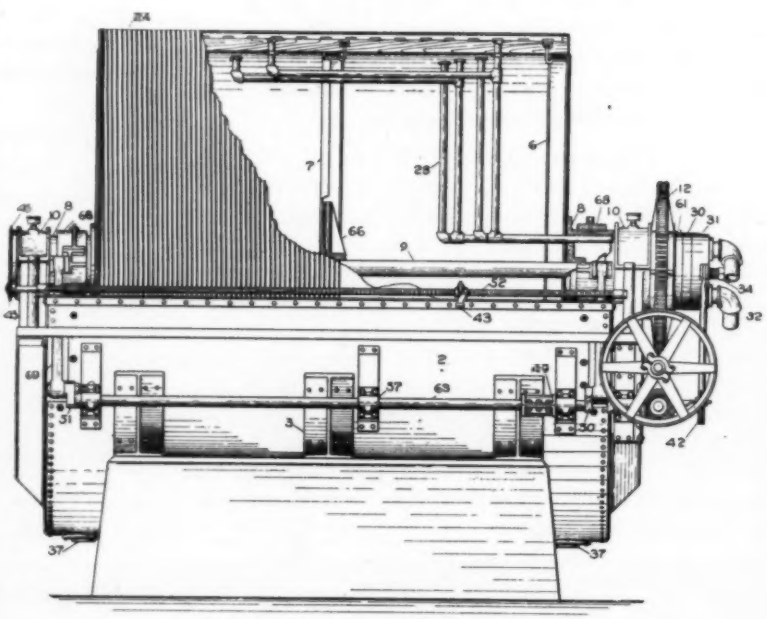


Figure 2

and dewater sludge of high caustic content, best results are obtained by operating 2 filters in series,

and that system is described later in this article. Cracking of cake is prevented by action of the sprays, since wash water is thus distributed evenly over a comparatively thin cake, insuring the best possible contact and displacement. The action may be described as being a progressive displacement of caustic rather than diffusion: the water driving the latter before it, in passing through the cake. There is a very vital difference between washing thin cakes on Vacuum Filters and thick cakes on Pressure Filters: in the latter channeling is common and practically unpreventable, whereas on a drum filter the cake is in full view of the operator and always controllable. Strong liquor is recovered undiluted and the weaker filtrate from the washing portion of the cycle may be sent back to the leaching cells, used in slaking lime, or sent back through the series of thickeners where counter current washing is employed.

Washing having been completed, final drying of cake ensues until the cake is discharged at the scraper. The scraper is more correctly called a deflecting apron because it simply deflects the cake after it is dislodged by the "blow." Discharge of cake is effected by special port-construction in the automatic filter-valve. The filter surface is divided into separate sections, each being independent of all others, and each having separate pipe connections to an individual header that leads out through the trunnion and into the automatic filter-valve. When the lower edge of a section reaches the scraper, vacuum is automatically cut off and steam at from 10 to 15 pounds pressure is admitted through the same pipe system, but this in no way affects the other sections of the drum. The steam not only assists in lifting the cake free from the cloth, but—and this is far more important—forces out all particles of carbonate that may have lodged in the interstices of the cloth, leaving a clean filter medium ready to build and wash another cake with unimpaired efficiency and capacity.

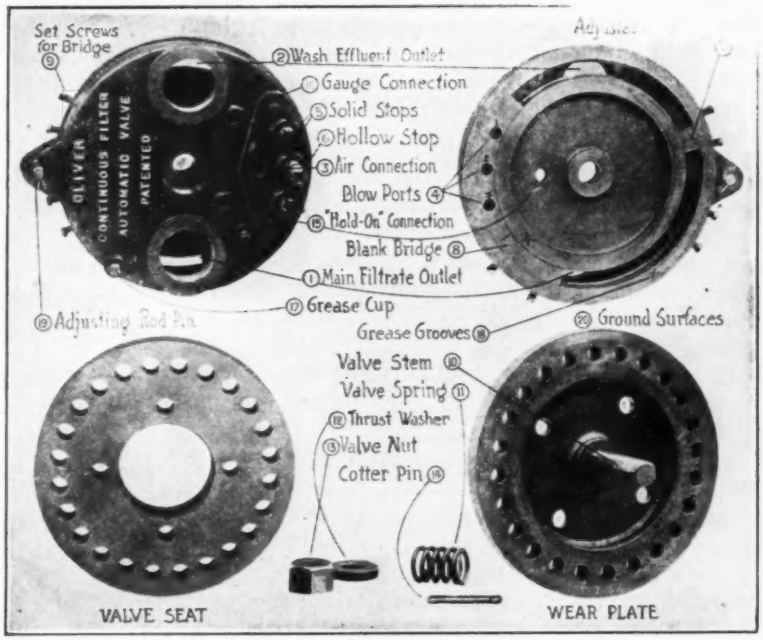
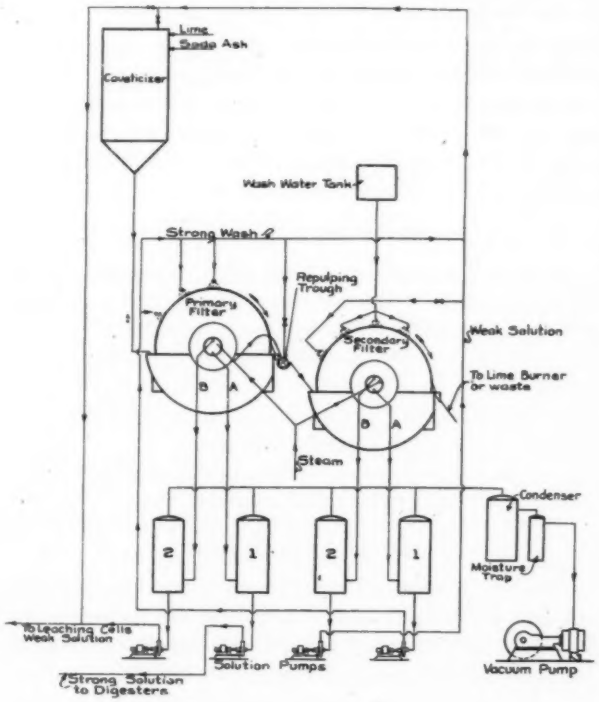


Figure 4



FLOW SHEET
TANDEM FILTRATION FOR CAUSTIC MUD

Figure 3

After discharge, additional blowing with steam through 2 more ports is practiced, if needed. That portion of the cycle devoted to discharge and cloth-cleaning with steam is blanked off from the vacuum connections down to the point where the section again enters the pulp level. Otherwise, bare cloth would be presented to the atmosphere and vacuum, throughout the system, impaired or even destroyed. Note Figure 4, showing valve details of a well-known automatic Vacuum Filter.

The accompanying tables give details of average automatic Vacuum Filter performance when using one filter only.

Combinations of Two Filters

The most satisfactory of all methods for lime-sludge washing and disposal consists of taking the

strong caustic sludge direct from the causticizing tanks to 2 Vacuum Filters operating in tandem.

After causticizing is complete, the charge is allowed to settle a short time and sufficient liquor decanted to leave a sludge containing from 20 to 25 per cent insolubles, and from 12 to 15 per cent sodium hydroxide. This sludge is fed to the primary filter at approximately 175 degrees Fahrenheit. Undiluted strong liquor is removed if no wash water is applied; or a small quantity of wash water may be applied, from 1 to 1.5 per cent sodium hydroxide and goes direct to the recovery plant. However, solution control may sometimes make it advisable to use this weak solution on the primary filter for re-pulping, and if so used, less wash water will be required on the secondary filter to effect the same reduction of caustic in the final cake.

In any case, the final lime cake contains from 38 to 40 per cent moisture and not over 0.3 per cent caustic by weight on dry basis. Accordingly, the

TABLE No. 1
Single Filter on Unsettled Mud

Sludge	Strong Sol. Lbs.	Strong Sol. %NaOH	Wash Sol. Lbs.	Wash Sol. %NaOH	Cake—Dry Basis %NaOH	Cake—Dry Basis % Recovery	Cake % Moisture	Capacity in Lbs. Per Sq. Ft. Filter Area in 24 Hours: Solids	Sludge	Strong Sol.
15.6% $CaCO_3$	1,250	16.84	2,070	4.07	1.52	97.44	39	300	1,920	1,620
	3,020	16.84	1,800	3.09	1.35	97.30	42	300	1,920	1,620
	2,860	16.84	2,180	2.53	1.25	97.21	38	300	1,920	1,620

TABLE No. 2
Single Filter on Settled Mud

Sludge	Strong Sol. Lbs.	Strong Sol. %NaOH	Wash Sol. Lbs.	Wash Sol. %NaOH	Cake—Dry Basis %NaOH	Cake—Dry Basis % Recovery	Cake % Moisture	Capacity in Lbs. Per Sq. Ft. Filter Area in 24 Hours: Solids	Sludge	Strong Sol.
24.8% $CaCO_3$	1,460	7.5	2,900	2.5	2.43	95.00	40.3	568	2,300	1,732
	1,410	7.5	2,800	2.7	2.18	93.00	40.0	768	3,090	2,322
	1,110	7.5	2,710	2.85	1.98	90.48	39.6	790	3,185	2,395

TABLE No. 3
Single Filter—Weak Caustic

Sludge	Strong Sol. Lbs.	Strong Sol. %NaOH	Wash Sol. Lbs.	Wash Sol. %NaOH	Cake—Dry Basis %NaOH	Cake—Dry Basis % Recovery	Cake % Moisture	Capacity in Lbs. Per Sq. Ft. Filter Area in 24 Hours: Solids	Sludge	Strong Sol.
12.5% $CaCO_3$	4,800	0.42	1,440	0.24	....	96.28	39	750	....	....
	4,920	0.42	2,850	0.22	....	94.70	37	702	....	....
	3,420	0.42	1,780	0.23	....	92.15	36.5	468	....	....

and the strong liquor kept separate from the wash solution which contains about 6 per cent caustic. This filter is operated with two objects in view, namely:

(1) Recovery of all possible caustic as strong solution; (2) discharge of a dry cake.

The two objects go hand in hand; the contained alkali in the discharged cake is only about ¼ of that leaving the causticizers, and the moisture content is approximately 40 per cent. On one filter over a 75 per cent recovery has been made, and we now have to deal with a comparatively weak alkaline sludge on the secondary filter.

The primary filter is fitted with a re-pulping trough into which the discharged cake falls. This U-shaped re-pulping trough contains a paddle-agitator which runs in stuffing boxes on the ends of the shallow trough. Weak solution from the first fraction of the secondary filter is delivered into this trough continuously at such a rate that a sludge containing from 30 to 35 per cent insolubles and not over 5 per cent caustic results. Steam is employed to maintain temperature of the sludge in this trough. From the re-pulping trough the sludge runs by gravity into the secondary filter.

Three lines of sprays are employed to apply hot wash water on the secondary filter. The filtrate, or strong solution, from the secondary filter contains from 2 to 3 per cent sodium hydroxide; most of this being used for re-pulping and for wash on the primary filter. The wash, or weak, solution contains total recovery is 95 per cent; i. e., from each ton of original sludge containing, say, 300 pounds lime carbonate and 1,500 pounds of 20 per cent caustic solution (or 300 pounds sodium hydroxide), we are recovering 285 pounds of sodium hydroxide and losing 15 pounds in the cake. (See Table No. 4.)

Re-Pulping System

Assume 2,000 pounds sludge with 15 per cent cake-forming solids. The solution titrates 13 per cent sodium hydroxide. This sludge consists of:

Insolubles, 300 pounds Calcium Carbonate
= cake-forming solids
Solution, 221 pounds Sodium Hydroxide
1,479 pounds Water
= 1,700 pounds of 13 per cent sodium hydroxide solution

First Filteration

On the primary filter the maximum amount of wash is that which can be used without reducing the tonnage. Dewater cake and get good capacity in tonnage of calcium carbonate, dry weight.

Cake will be discharged containing 40 per cent moisture, so it will consist of:

300 pounds Calcium Carbonate.
200 pounds 13 per cent Sodium Hydroxide Solution.

Since the solution in the discharged cake contains 13 per cent sodium hydroxide, there is 200 × 13, or 26 pounds sodium hydroxide. There were 221 pounds of sodium hydroxide in the sludge fed to the primary

filter, and as 26 pounds were contained in the discharged cake, there were 221 — 26, or 195 pounds recovered; which shows that 88.2 per cent of sodium hydroxide was recovered. However, mechanical losses and other variables reduce this recovery, so it ranges from 75 to 85 per cent.

Second Filteration

Re-pulp cake discharged from the primary filter in 1,000 pounds of 3 per cent sodium hydroxide solution which comes from the washing period on secondary filter. Thus, the sludge consists of:

300 pounds Calcium Carbonate.
26 pounds Sodium Hydroxide (contained in cake).
174 pounds Water (contained in cake).

TABLE No. 4

Re-Pulping System—Two Filters in Series

Operation of Primary Filter

Figures are based on the filtration of 1 ton of caustic sludge from the causticizing tanks; discharged cake contains 40 per cent solution in each mill.

Mill	Sludge % $CaCO_3$	Solution % NaOH	Filtrate Total	Lbs. Cake—Lbs. NaOH	Lbs. Cake—Lbs. NaOH	Recovery % NaOH	Capacity in Lbs. Per Sq. Ft. Filter Area in 24 Hours Solution	Capacity in Lbs. Per Sq. Ft. Filter Area in 24 Hours $CaCO_3$
A	25	13	1,170	152	43	77.9	1,170	500
B	20	15	1,335	200	40	83.3	1,335	400
C	15	12	1,500	180	24	88.2	1,500	300

Cake from A repulped in 3% NaOH sol. to consistency of 35% insolubles.
Cake from B repulped in 1% NaOH sol. to consistency of 25% insolubles.
Cake from C repulped in 2% NaOH sol. to consistency of 20% insolubles.

Operation of Secondary Filter

Figures are based on the filtration of 1 ton of repulped caustic cake taken from primary filter; and using hot wash water amounting in each mill to 3 times the weight of the wet cake discharged by primary filter.

Mill	Sludge % $CaCO_3$	Solution % NaOH	Strong Sol. Lbs.	Strong Sol. % NaOH	Weak Sol. Lbs.	Weak Sol. % NaOH	Lbs. NaOH in Strong Sol.	Lbs. NaOH in Weak Sol.	Lbs. NaOH in Cake	Recovery % NaOH	Capacity Lbs. of $CaCO_3$
A	35	6.54	1,040	5.5	3,284	0.75	57.0	24.0	4.0	95.3	850
B	25	4.07	1,200	3.5	2,462	0.68	42.0	16.7	2.3	96.2	600
C	20	3.69	1,280	3.0	1,954	0.90	38.4	17.6	3.0	94.9	450

30 pounds Sodium Hydroxide (from wash period on secondary filter).
970 pounds Water (from wash period on secondary filter).

1,500 pounds Total.

The 1,200 pounds of solution in this sludge contains 56 pounds of sodium hydroxide, or 4.67 per cent.

To 1 part of dry cake 4 parts, or 4×300 pounds calcium carbonate equals 1,200 pounds, of hot wash water are used. Washing reduces sodium hydroxide content of the solution left in cake to 1.5 per cent.

Discharged cake contains 40 per cent moisture, so it consists of:

300 pounds Calcium Carbonate.
200 pounds 1.5 per cent Sodium Hydroxide solution.

Thus, there are 200×015, or 3 pounds sodium hydroxide lost in the final discharged cake, and **none** of this would be lost in mills where cake is re-burned.

Feed to the secondary filter contains 56 pounds sodium hydroxide and 3 pounds are lost in the discharged cake, so the recovery of sodium hydroxide is 94.64 per cent on the secondary filter.

Original sludge fed to the primary filter contained 221 pounds and the final discharged cake from the secondary filter contained 3 pounds of sodium hydroxide, so that 218 pounds, or 98.64 per cent, is recovered by the operation of the two filters.

Summary

Assuming that causticizing tanks hold ten tons sludge and that in each mill, after causticizing is complete, the insolubles represent 15 per cent of the total weight of the charge, in both mills A and B decanting must precede filtration, but in mill C no decanting is practiced.

	Mill A	Mill B	Mill C
Total pounds NaOH in tank	2210	2550	2040
Pounds NaOH in decanted liquor	1040	750	0
Pounds NaOH recovered by primary filter	912	1549	1799
Pounds NaOH recovered by secondary filter	245	241	228
Pounds NaOH lost in final cake	13	10	13
Total pounds NaOH recovered	2197	2540	2027
Per cent NaOH recovered	99.4	99.6	99.4

Filter arrangement and details of solution control are shown on the accompanying flow-sheet.

When practicing double filtration in a plant discharging 50 tons dry weight of precipitated lime carbonate per day of 24 hours, operating costs are as follows:

Labor is assumed at $0.50 per hour, and power at $5.00 per horse-power per month.

Sludge going to primary filter contains 25 per cent insolubles by weight, and the liquor is 13 per cent caustic.

Power—

2 Filters @ 2-HP each	4 HP	
4 Centrifugal Pumps, 3-HP	12 HP	
1 Vacuum Pump	30 HP	
1 Belt Conveyor	5 HP	
	51 HP @ $5	$255 mo.
Labor, 3 men (1 for each 8-hour shift) @ 50c hr.		$360 mo.
Repairs, renewals and upkeep, including muriatic acid for washing monel filter cloth @ $2 day		$60 mo.

Based on 1,500 tons per month capacity, the per ton cost is:

Per ton dry weight calcium carbonate	
Power	$0.17
Labor	.24
Repairs, etc	.04
Total	$0.45

Installation cost, on the above basis of 50 tons capacity per 24 hours, is estimated at $17,000. Interest

at 10 per cent will amount to $1,700 per year, or $141.67 per month, or $0.09 per ton dry weight of calcium carbonate discharged.

Floor space occupied is only about 1/5 that required for Intermittent Settling and Decanting or for Counter Current Washing.

Combinations of One Filter and Two Continuous Thickeners

By putting average lime-sludge through 2 continuous thickeners the underflow from the second thickener can be fed to a filter in suitable condition for successful washing in one operation. Sludge going to the filter will contain 40 per cent insolubles and the remainder will be a 5 per cent caustic solution. Reference to Tables Nos. 1, 2 and 3 indicates a good total recovery of caustic. However, feed to the filter is variable in caustic content, and this necessitates close attention to filter operation. The installation will occupy 3 times the space needed for 2 filters, and results will be variable: caustic loss averaging, at least, 50 per cent greater than when using 2 filters in series.

Continuous Vacuum Filters are destined to occupy an important position in paper mills, and their usefulness is by no means limited to the handling of lime-sludge. Several such filters are already in use washing the black-liquor from chemical fibre and they are expected to find a wide application as "save-alls." Operators are also considering the use of this machine to partially take the place of wet machines in making up laps from ground wood or chemical stock, and they are already in use commercially on black-liquor by-product work.

Reduce Pulpwood Decay by Proper Storage

WOOD storage conditions at pulp mills are the primary causes for pulp losses as high as 400 pounds per cord of wood, and inestimable losses through poorer quality of paper. Recent investigations by the U. S. Forest Products Laboratory, Madison, Wisconsin, have shown that the wood yards of many mills are littered with rotting bark and debris which serve as sources of infection for the fresh wood. Pulp wood is generally piled directly on the ground, which is usually poorly drained and overgrown with weeds, thus preventing the necessary circulation of air. The wood is not used in rotation, and some of it remains in the piles for several years. These conditions must be corrected before the mills can expect to control the decay problem.

The chief points recommended by the laboratory in reforming the present practice of pulpwood storage are:

Ship pulp logs as soon as possible after cutting, to prevent their lying in the woods where high moisture content and growing vegetation tend to cause infection and decay.

Peel logs, if possible, as this prevents borers from attacking the wood, and also hastens air drying.

Drain and care for storage yards, so as to reduce the soil moisture as far as possible; cut weeds to permit better ventilation. Filling in the yard with cinders will give good drainage and keep down weeds. The yard should never be placed on barker waste.

Do not rick wood directly on the ground. The best procedure is to pile it on stringers supported by concrete piers or creosoted wood blocks. The stringers should be pressure-treated with coal-tar creosote. The piers or blocks should be high enough to raise the stringers at least 12 inches off the ground to allow for ample ventilation.

If ground is available, pile so that the full length of the pile is exposed to the prevailing winds. Never place the piles less than three feet apart.

Mark each pile of logs with the date it was received and, if possible, the age of the wood. Use up the wood in rotation.

Upon removal of a pile of wood, clean up the debris and burn it, lest is become a source of infection for new wood. All infected skid logs should be removed.

Where timber is placed in conical piles by conveyors, a possible remedy may be to keep the wood saturated with water by means of an overhead sprinkler system delivering the minimum amount of water necessary to keep the surface of the pile wet. Wood saturated with water will not rot because there is not enough air within the timber to allow the fungi to grow. Whether it is commercially possible to wet the piles down sufficiently and maintain them in this condition must, however, be demonstrated by actual test.

You All Know Him

He may wear a last year's straw hat, his finger nails may need manicuring; his vest may hang a little loose, and his pants may bag at the knees; his face may show signs of a second-day's growth, and the tin dinner bucket he carries may be full of dents and doughnuts; but don't you call him "the old man." He's your father.

For years and years he has been rustling around to get things together. Never once has he failed to do the right thing by you. He thinks you are the greatest boy on earth; bar none, even though you plaster your hair back, wear smart clothes, smoke cigarettes, and fail to bring home a cent. He is the man who won the love and life partnership of the greatest woman on earth—your mother.

He is "some" man and not "the old man."—Mead Co-operation.

Uncovered pits are dangerous. When you have to remove a pit-cover always see that it is replaced before you leave says the National Safety Council.

Dyeing Paper

By PAUL DE GUEHERY

IN one of the recently published treatises on the subject of papermaking the author says: **"Even newspaper has some color added,"** but what he should have said is, that **Even the highest grade of white paper,** ledger, bond, writing, usually carries a small amount of dyestuff. In the case of the high grade paper, although the raw material in itself is very white and brilliant, it is considered necessary to add a small quantity of dyestuff, usually a touch of blue and red, to improve the appearance. In the case of the newsprint, the dyestuff is added to overcome the dull, dead appearance of the low-grade raw material that has to be used to produce a low-priced finished product. The color is necessary in order to make the dull, dead, dirty looking newspaper in its natural shade more pleasing to the eye and consequently improving its selling qualities. Everyone has still in his mind the shade of our newspapers during the war, when the cutting off of imports from Germany deprived us of the necessary dyestuff suitable for this particular work.

As it is impossible to produce here an article of the nature which the deplorable lack of literature on the subject warrants, the writer will limit himself to making some general remarks, which should prove of common interest and stimulate an exchange of ideas and personal experiences, that will be beneficial to all concerned.

There are various methods of coloring paper, namely:

Coloring in the beater; dyeing by dipping; calanderstaining; coating, and printing.

The first method is of the most importance from a paper-makers standpoint, and the following will treat principally with dyeing in the beater.

The dyestuff can be added to the pulp in the state in which it comes or after preliminary treatment of some kind, such as diluting or dissolving. The easiest way naturally is to add the dyestuff as it comes, taking it out of the barrel or whatever container has been used, weighing or measuring it off and putting it into the beater. But this is not always possible nor advisable.

First of all, only such dyestuffs can be used for immediate application as are readily soluble in water and which do not contain objectionable residue of any kind. For papers that do not require beating for any length of time, it is always better to dissolve every color used, as a dyestuff in solution will insure a quicker and better distribution than when added in dry form. In cases that do require a considerable time of beating, sometimes for hours, the dyestuff will have ample time to dissolve and do its work and the addition can be made in dry form without fear that colorspecks will show up and spoil the paper.

However, basic dyestuffs should always be dissolved first with hot water, and, if possible, with the addition of acetic acid, regardless of the time the pulp is kept in the beater.

The better the grade of the paper, the greater care should be taken in every single step of its manufacture, and for high grade papers, dyestuffs of any description should never be used without being carefully dissolved and besides should be added to the beater through a fine sieve.

For the use in medium and lower grades of papers, there are a number of products on the market that are brought out with the idea of simplifying the application and eliminating any extra handling. One of these methods of making a dyestuff more suitable for its particular work has often been the cause of much misunderstanding and mischief. That is the reduction of the concentrated dyestuff by means of adding certain proportions of salt or other inert products, such as sugar, Glauber's salt, etc. Providing the dyestuff has been obtained from a reliable house, it is in many cases not only justified, but extremely advisable and more economical to use a greatly reduced product at a proportionately lower price than to use a highly concentrated one at a higher price.

For Instance:

A certain paper requires one ounce of a certain color, and as it is desirable to eliminate any extra handling wherever possible, the recipe calls for direct application of the dyestuff in powder form to the pulp without previously dissolving it. The beater engineer according to his formula weighs off 1 oz. of the dyestuff and throws it into the beater as required. The beater room is not always built like a jewel box but very often, in fact too often, has dark corners and in one of these corners stands the scale. Even under better and normal conditions it cannot be expected that the beater engineer is able to make his weighings with the accuracy and fineness of a trained chemist. The variation that is therefore to be considered in this work is rather large and is apt to cause unnecessary trouble for the mill. Suppose the beater engineer weighs on his scale exact to $\frac{1}{8}$ of one ounce by weighing off one ounce. He then would run the risk of either over or underweighing the required amount to $1\frac{1}{8}$ resp. $\frac{7}{8}$ of one ounce. That error would mean a difference of 12.5% based on the right amount of dyestuff and of 25% between maximum and minimum, a difference very much in excess of the possible allowance and of what is cus-

tomary. Besides, he never would be able to produce a uniform run of paper, he would have trouble continuously, and ultimately so effect the quality of his paper that he would bring a monetary loss to his mill.

Now, let us assume the same beater engineer in the same mill is making the same paper on the same machine and is using the same dyestuff, but in greatly reduced form. The dyestuff has been purchased reduced 1 to 10. The beater engineer weighs off the corresponding amount of dyestuff, that is in our case 10 ounces, on the same scale as before and making the same weighing with the same inaccuracy of ⅛ of one ounce. The result would then be a possible variation of approximately 1.25%, a percentage that can be ignored without injuring the quality of the paper. In fact, it is absolutely impossible to detect a difference of 1.25% in the strength.

The slight advance in cost caused by using the reduced article—higher freight, etc.—is offset easily and many times by more uniform runs resulting in more satisfied customers.

A similar result to that shown in the above example can be accomplished by using the dyestuff in form of a solution greatly diluted, and instead of weighing off the required amount necessary to color one beater, measuring the liquid ounces. But this procedure necessarily requires dyestuffs which do not precipitate or deteriorate when left standing in solution for several days or even for a week and longer. In such a case, care should be taken that no water or at least as little as possible evaporates, otherwise the color solution becomes gradually stronger and consequently would again cause uneven runs.

Mixtures

A great many users of dyestuffs condemn any dyestuff that looks like a mixture and declare that they would never use a mixture. These people never have taken enough time to ask themselves whether or not there might be another reason for this, than simply to make as much profit as possible or even unfair dealing.

When a mixed color composed of different individual dyestuffs can be bought and used, it naturally lessens operating expenses inasmuch as the beater engineer or whoever has charge of the color room has only one operation to make instead of three. Three weighings give three chances for errors; one weighing only one. There arises the question of which offers the better advantage: to take the chance in using a mixture, that this mixture might not run uniform all the way through, thereby eliminating two operations, or to run the risk of errors possible in making three weighings of the individual dyestuffs instead of only one. The writer's opinion is that wherever possible a mixture should be used; that is, for cheaper grades of paper and standard shades it pays. In papers where the variation in color of the raw material, very small in itself, is to be considered, the use of the individual dyestuff is preferable.

There always have been mixtures and there always will be mixtures; they are absolutely necessary. From a consumers point of view, mixtures should always be tested with special attention and not only every shipment but every single package. While as a rule the large and reliable houses employ every possible means to insure perfect uniformity, nevertheless it should never be considered wasting money to repeat these tests.

Under the term of mixtures, the writer has so far only referred to these products which are made to order according to an established formula, necessary to obtain a certain shade. There are also other mixtures on the market that are being made, sold and bought for reasons of different nature and are sometimes quite objectionable. The war brought out the most wonderful concoctions, but luckily those things never last long.

Where a test is required to ascertain whether or not a dyestuff is a mixture, the following method gives satisfactory results: Take a deep porcelain or enamel dish with a white inside, fill with warm water and sprinkle the dyestuff on the surface. The various particles will slowly dissolve and fall to the bottom. A very distinct picture of the physical nature of the dyestuff is produced.

Another way to determine the composition of a dyestuff is the blow test: Wet a piece of filter paper with water and blow some of the dyestuff from the point of a knife against it. The various particles will partly dissolve and show clearly whether the dyestuff is a straight product or not.

Mixtures are sometimes unavoidable and necessary from a manufacturer's point of view also. I am no dyestuff chemist, but my common sense tells me, that it is humanly impossible to produce a product absolutely uniform in every respect with every single batch. The paper manufacturer himself gets a certain allowance for over or underweight on his product, why not give the dyestuff chemist his chance? The papermaker cannot remedy his over or underweight by subtracting or adding some few pounds of paper per ream. The dyestuff man fortunately can improve his product. If a batch of a certain yellow turns out to be too green, he easily can throw it over to the red side by adding a little red or orange or reddish yellow. Naturally both dyestuffs must be of the same class, must have the same qualities in every respect. But the impression on anyone who does not understand the situation, is that the article is a mixture, and in truth it is. Although it is represented as a straight product, it is a perfectly justified mixture.

Mixing of Dyestuffs of Different Classifications

Basic and acid colors should never be used together, excepting cases where the classification is

not sharply defined, as, for instance, with Rhodamine and Eosine.

Basic colors should never be mixed with direct colors, either in dry form or in solution. They can, however, be used satisfactorily in the same dyeing, one after the other. The method of dyeing in such a case is as follows:

Dye the paper in the beater with a direct color using common salt or Glauber's salt, and heat to set the dyestuff. Then wash carefully until all excess of the direct dyestuff is removed and top off with basic colors. The direct dyestuff acts as a mordant for the basic color. By this method exceptionally deep shades can be obtained, which otherwise would either be subject to uneven runs or unnecessary waste of dyestuff.

A reasonable excess of alum is necessary for most all colors with but a few exceptions, such as Benzo Purpurine, Congo Red, Metanil Yellow and a few others.

Twosidedness

The majority of dyestuffs belonging to the acid group are sensitive to heat and produce two-sided effects on the finished papers. This feature is further increased by too heavy suction on the suction-boxes or on the suction-roll. To avoid that danger, acid colors should never be used where a suction-roll is in operation. They are not fast to washing, and therefore are apt to cause a much larger variation than basic or direct colors would show under similar circumstances.

Furthermore, the use of a filler in the furnish and the structure of the surface of the paper have both a great influence on the twosidedness of a sheet, but as this can hardly be blamed on a dyestuff, it shall not be discussed further at this time.

Mottling

Weak or reduced colors will prove to be quite advantageous, where the dyestuff is apt to cause a mottled effect in the finished product. This mottling is caused by the great affinity which certain dyestuffs have to certain fibres. These dyestuffs dye those fibres which they strike first, when added to the pulp, with greater intensity than the other ones, as there is not enough dyestuff left to dye the remaining fibres equally deep. The stronger dyed fibres then appear all over the sheet and are quite objectionable, unless this mottled effect is especially desired for such purposes as wallpapers, art papers, etc.

Dyestuffs, that principly cause this trouble are the basic colors, such as Methyl Violet, Methylene Blue, Fuchsine, etc., colors that are commonly known everywhere, and it is worth while to consider their application and various remedies for the above mentioned troubles.

As already stated the dyestuff dyes those fibres that it touches first, due to its great affinity, a deeper shade than the others. Where the beater-furnish consists of all sulphite, the one way to avoid the danger of mottling is to use as much water for dissolving the color as practically possible. Basic colors should always be dissolved previous to their application, and furthermore the color solution should be added **cold**, neither hot nor warm, as heat will only increase the trouble instead of avoiding it.

If a still larger diluting is desired than is possible and practical, when adding the dyestuff at the regular time, it might, under certain conditions, be suggested to put the dyestuff into the white water before furnishing the pulp. But quite often even such a great reduction will not entirely eliminate the mottling of the fibres.

Another method is the following, a method that has been employed satisfactorily in a number of mills making paper composed of a mixed stock of ground wood and sulphite. It is especially adaptable for mills where the woodpulp does not pass over a wet machine, but is pumped from a storage chest directly into the beater or a mixer. In such a case the color solution is directed either by hand running out of a pail or through a small pipe leading from a stationary tank, installed for this purpose, into the incoming stream of ground wood and is thoroughly mixed with it. The affinity of the dyestuff to the ground wood fibre is not as intensive as to other fibres and naturally will allow a more even dyeing. The required amount of sulphite is added last.

Still another way of reducing the danger of mottling fibres is to add the dyestuff after the size and alum have been added. However, all this depends largely on local conditions and every superintendent and beater-engineer has to find his own ways and means to obtain most satisfactory results and to eliminate all defects.

A tremendously important factor here as well as throughout the manufacturing process is the water question. Just as a brewer cannot make good Pilsner beer in Kalamazoo, a papermaker cannot make an A1 ledger with any water he happens to find.

Very good results have been obtained in book paper mills or mills making similar grades of papers by using a so-called clay-blue. These clay-blues are based on the fact that china clay has the peculiar quality of absorbing a certain amount of certain dyestuffs to a small extent and then to act as a kind of a carrier for the latter. As the actual amount of dyestuff that can be carried is rather small, this method is only practical and economical for tints and light shades. But where these clay-blues are suitable, they produce very satisfactory results; they can be added to the beater in the state in which they come; they eliminate all danger of mottling and as they do not have very much coloring power, a small weighing error, sometimes unavoidable, consequently does not cause much trouble.

Speed Inter-Lock as Applied to the Paper Machine

By F. G. WARBURTON
Harland Engineering Company, Ltd.

Paper Read at the Annual Meeting of the Technical Section of the Canadian Pulp & Paper Association, Montreal, January 19 and 20, 1921

I HAVE confined my subject, as far as possible, to mechanical considerations and the general effect of same on the production of paper, referring as briefly as possible to allied subjects such as Thermo-Dynamic mill efficiency, which fascinating subject alone could easily occupy this available space.

Almost every paper machine in the world today has some form of belt, or rope and belt drive. Over a considerable number of years in various countries, attempts have been made to drive paper machines sectionally by individual electric motors. In the past the result has been the same in each country, generally a pitiful failure, sometimes after really heroic struggles, to save the drive. Why this desire for some other form of driving? What has impelled man in the past all over the world to depart from accepted practice in the driving arrangements of the paper machine? Not, I think, simply the desire of change—that does not square with human psychology. Was it not because they realize at least some of the imperfections of usual drives, dirt, danger, power consumption, stoppage, maintenance, etc.? I suppose, having motors in the rest of the mill, they realized the great advantages of individual motor drives. Whatever may have been the prime reason in each particular case, collectively there is no doubt that the desire for change reflected dissatisfaction with drives existing. Unhappily, however, for manufacturers and for the industry, in the state of the art as it then was, they were indeed "Out of the frying pan into the fire." They had not their troubles to seek.

I sometimes wonder where the ignorance lay. Was it a lack of knowledge of the accuracy of speed regulations required as between the section, or, was it a disregard of the inherent characteristics of motors on the part of those responsible for such installations? In practice, the performance of the paper machine with uncontrolled motors was worse than with belts, and no wonder; the marvel is that such installations allowed paper to be produced at all. In brief, a variable speed motor "uncontrolled" can, between full and no load, have a speed characteristic as much as 50% bad. I will show later how such a motor, or collection of motors, controlled by the "Inter-lock" are made to act as though they had speed characteristics 100% perfect. Before doing so, however, I wish to analyze present driving arrangements; in other words, mechanical drives in which at least one belt is used per section. Various names are given such drives; e. g., "Marshall," some have no names, perhaps just as well!

The drawings of a modern 166″ paper machine by a well-known builder, so modern that the machine is still being built, showed five links of transmission between the couch and press rolls and the prime mover, each comprising one rope, three belt, and one gear connections; the other sections had less links.

Belt Action Under Working Conditions

Let us consider the action of a single belt under working conditions. For the moment we will consider only flat pulleys, or pulleys having a slight crown. Later, we will consider the special case of cone pulleys. Power is transmitted by a belt due to tension difference between the two sides of the belt. When at rest, with no torque or resistance to torque, the tensions on each length of the belt are equal, but, directly the driving pulley commences to exert torque the tensions on the top and bottom sides of the belt are no longer equal, and as soon as the difference in tensions becomes great enough to overcome the resisting torque, motion commences. When running, all other things being equal, the amount of power transmitted by a belt is directly proportional to the difference of tensions.

Which of us, having a prime mover with a pulley 24″ diameter, running at 500 revs. and a driven shaft that we desired should run at 500 revs. would put on the driven shaft a 24″ diameter pulley? Some of us, perhaps, in our early days tried. Those who did, found, as I did, in my early days on the test-bed, that it cannot be done. We got into the habit of allowing that the driven pulley should be a few per cent smaller in diameter than the driver as compared with the arithmetical ratio of diameters and speeds.

Why is this necessary? Where the difference? The difference is made up of two factors, stretch and slip. A belt, like all other materials, has a coefficient of elasticity, and with every strain there is a relative elongation and the greater the strain the greater the elongation. As seen above, the strain on one side of the belt is greater than on the other side of the belt when driving is taking place, and so one

pulley is receiving a greater length of belt than is being received by the other pulley, to compensate for this the driven pulley runs slower. This factor may be described as stretch or creep. There is still another factor which causes the driven pulley to run still slower than if only creep came into consideration,—"Slip." Now the other factor, "Slip." I apologize for bringing authorities to bear on the slip factor. My justification is that I have been told so many times by well-known men, some engineers, that

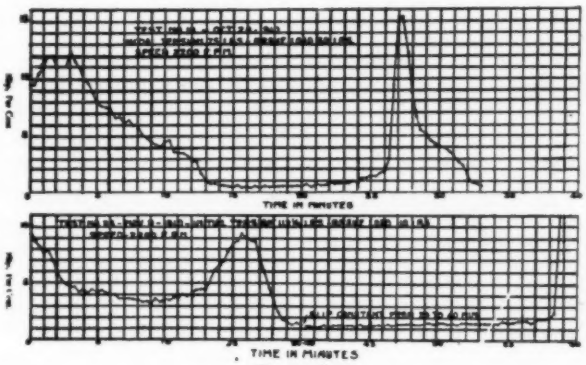


Figure 1

there is no such thing as belt slip, but only creep, that there would seem to be the need.

Unwin "Elements of Machine Design" (1919 edition) says:—

"The earlier writers assumed that there was no slipping of the belt on the pulley, and that if slipping occurred the belt would cease to drive. So far is this from being the case that there is always some slip of the belt."

Again, "A belt is not used in cases where a very exact velocity ratio is necessary."

Lewis, Tran.Soc.M.Engrs. Vol. VII. "The usual slip in driving may be 1% each pulley; i. e. 2% altogether. At 10% usually the belt throws off."

Imagine 10% stretch! And yet some men say there is no slip.

Professor Lanza (Trans. Am. Soc. Mech. Engrs., VII, 374) shows that the coefficient of friction itself between the belt and the pulley depends on the amount of slip, and that whereas with a 1% slip on a pulley the coefficient of friction was .33, at a slip of 14% the coefficient had risen to .82.

Professor Sawdon, M. M. E., of Cornell University, is the only other authority that I will quote. Some of you may have read Prof. Sawdon's paper entitled "Test of the Transmitting Capacities of Different Pulleys in Leather Belt Drives," read before the National Association of Cotton Manufacturers, Sept. 29, 1911. Prof. Sawdon claims that the eleven months of testing at Sibley College, Cornell University, are perhaps the most thorough tests ever taken on belt slip and creep. No less than eleven months of steady testing, during which 9,000 observations were taken on a machine specially constructed to measure slip and creep, etc.

He says, "By taking continuous observations of slip over long intervals of time, with the machine running under constant conditions of tension, brake load and speed, data was collected and curves plotted between per cent. of slip and time. Those on Figure 1 are typical."

Most of us, I fancy, would expect over a period of thirty minutes, that with a constant load, slip and stretch would be nearly constant. Look at the curves, the load a Prony brake, no workshop conditions, no mess, no oil around, no steam, and yet we see, that with a dead load, the slip varies over a period of 30 minutes between .5 and 15% on the top curve, and on the bottom curve between 1% and over 10%. Our authority says that these are perfectly typical curves. "From these it would be seen that the slip is continually varying. By comparing a large number of such curves, it was found that this variation takes place through no clearly defined cycle." Had the belt speed during test been high, one might have suggested air pockets, but the conditions of test prevent any such thought, the belt speed over all tests was low, 2200 F.P.M.

Let us now look at a condition of load variation. In a pamphlet, I find reduced to figures, the average of eleven months' work. Let us take one case only on account of time, a load increase of 20%. The belt is supposed to be normally loaded after the 20%; i. e., ratio T/t 3.57, a very normal figure. The slip has changed from 2.26 to 3.29%, i. e., more than 1% change.

Now let us consider the condition above on the paper machine itself. The sectional draw is set at less than 1%, perhaps at .5. A 20% change of load takes place, such as is caused by the addition of weights or increase of bearing friction, we find that the slip has changed on the section 1%. But the draw was only at the most 1%; therefore, the draw has changed 100%. If we used the .5 figure for draw, the change of draw would of course be 200%.

We have all seen this in practice. Many have

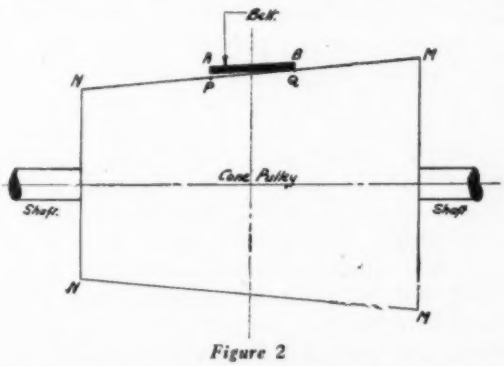


Figure 2

smoothed out this annoyance by altering the draw handwheels along the whole machine until this undesired draw was stroked out. Consideration of the Sawdon curves clearly shows that even a change of load is not necessary to alter the speed relationship

between sections, but the peculiarities of belt performance will do all this without load change at all.

Figure 3

All the more credit to the operators, who by skill of eye and hand, beat out such belt transmission peculiarities.

Action on Cone Pulleys

Just a moment, on Cone Pulleys. The pulley shown in Fig. 2, is the driven pulley. The smaller diameter is NN, the larger MM. The belt AB and the points of extreme contacts PQ. Now points NPQM are all making the same revolutions per minute, but point M is making a greater peripheral speed than N and in like manner Q a greater speed than P. But the point of the belt A is making the same linear speed as the belt point B. Now we know that normally the intensity of contact at BQ is greater than at AP. Suppose that the centre of driving force of the belt is located at the point BQ, then the slip at AP must be very great. On the other hand, suppose that the centre of driving is towards A, but nearer to B, then we find that the point of the pulley most closely in contact with the belt, viz.: Q is running faster than the belt, and that the pulley at Q so closely in contact, is actually trying to drive the belt, although this is the driven pulley we are considering. Looking at "cone pulleys" in this same pamphlet, we see the point "Q" bright, and a little way down a dull portion, and then again bright, and then again dull. A battle of frictions, positive and negative, not very efficient! A method of giving constant draw! It is used as such. When discussing flat pulley drives once with a paper maker, I was told "the best paper is made on machines with flat pulleys" whereon the face of which paper is stuck. Is there any wonder?

Since writing the above, I have been fortunate in obtaining a photograph of a new cone pulley where the battle of frictions had not had time to wear out the tool marks all over the pulley, the draw at that time had not been changed and so we can see all the bright and dull spots as discussed above in a most illuminating fashion. The pulley shown in Fig. 3 is the reel pulley on No. 8 Laurentide Machine, the time of running only a matter of days to run in the bearings, load light, the initial tension that usually put in by mill mechanics—rather severe! Could a tale be more clearly told than this picture tells?

Let me say also that I was able to push a 15/1000 feeler a considerable way in between the belt and the pulley at the small diameter end of the pulley, in spite of the high initial tension.

It is quite easy to make both edges of the belt grip the pulley with almost equal intensity by setting the pulleys out of alignment as referred to a line at right angles to the two shafts and running through the centre of each pulley, both shafts still being parallel to each other. Let us call this a positive direction of staggering the pulleys; what do we find in practice? The staggering is done in just the opposite direction, and instead of bringing each edge

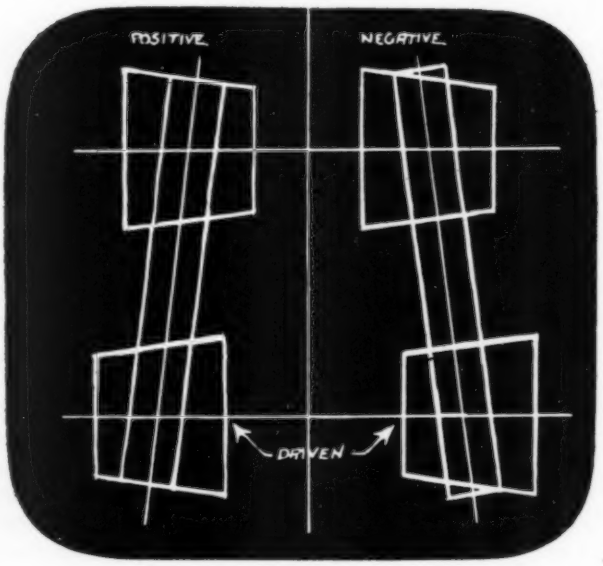


Figure 4

of the belt into closer contact with each pulley, actually, an attempt would appear to be made to accentuate the gap on the narrow end of each pulley, evidently it has been found that the battle of forces is too great even when the pulleys are set in a normal

fashion without staggering, for, all over the world cone pulleys are so staggered in a way to make the belt free at the narrow diameter of the pulley.

It is clear that power is transmitted to the belt by the driving pulley near one edge and that power is taken out by the driven pulley from near the other edge of the belt, an interesting way of transmitting power and one which the belt objects to as indicated by the way the fasteners or laces more rapidly tear out at each edge of the belt than at the centre.

Another thing which is quite clear from our picture which is well known in practice, is that one cannot indefinitely widen a belt on a cone pulley, because the wider the belt the more fierce the battle of forces, the lower the efficiency of drive, and the shorter the life of the belt.

Individual driving of paper machines has shown by comparison how inefficient the transmission of power by cone pulleys can be.

Inter-speed Control

I suppose no one will disagree that, other things being equal, the machine that has the most perfect speed control as a whole, and particularly the most perfect Inter-Speed control, will produce the best paper. A paper-mill owner in Scotland a few years ago told me, that, by taking out the engine which previously drove the variable speed end of his paper machine, and replacing same by an electric motor, he was able to produce, on the same machine, paper to a 15% keener specification than ever he was able to do before. He had all the belts as before, but a motor in the place of the engine; the governing was better, that's all, for the whole machine. Today, it is possible for the paper maker to have perfect speed harmony as well in between sections where it counts most in the product produced and in the cost of production.

For the first time in the history of paper making, the paper machine may now be a positive instrument in the hands of the operator. Such a machine has been in operation since the early days of the war with the Inter-lock control, some six years of continuous operation. The machine may almost be described as a jobbing machine; its usual service is to run a few hours on one class of paper and then to change over to another class of paper and speed. The speed variation for running conditions is on that machine, 10 to 1. The machine was one of the type mentioned early in the paper with a sectional drive, which had given so much trouble that the management were on the point of throwing it out. The motors were in many ways not the most suitable for Inter-lock control. But, in spite of that the machine with Inter-lock control is running today and has been producing paper throughout the war.

Inter-lock Control Described

I have been asked to describe the Inter-lock particularly as installed in connection with the new Laurentide machines, and I wish to thank the management of the Laurentide Company for their permission to do so.

In a short paper it is impossible to cover the whole subject of sectional motor driving of paper machines. I will need be content with covering some of the major considerations of the Inter-lock, but I most earnestly ask that you put forward questions, and I will do my best to answer them.

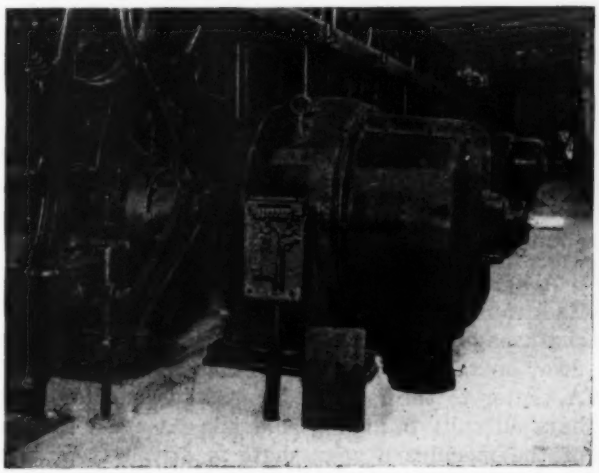


Figure 5
Typical sectional drive unit as installed on Laurentide's new machines

Each section has its own motor. The drive may be through any form of gearing, or the motor may be direct coupled to the section. In the case of slow speed machines there is no doubt that some form of gear box is the best, be it worm, or of the herringbone type. For high-speed machines, to direct-couple is probably the best on account of space considerations; on account of efficiency, there is nothing to choose. The slow speed motor has an efficiency about the same as the combined efficiency of the higher speed motor and the gear box if of the herringbone type; a combination of both systems is used at Grand'Mere. See Fig. 5.

The motors and inter-locking regulators are in the machine room, they are of the totally enclosed type, with forced ventilation, all motors and regulators being on the machine room floor; this arrangement protects the plant against hose displays at the wet end, and against the high temperature air conditions around the dryers, and, as filtered air is used, the motors are kept clean. A nice arrangement sometimes possible in the case of a new mill is to build an annex for all the electrical equipment, to keep this clean and dry, and to allow the driving shafts to pass through a wall of the annex to the machine room. The motors at Laurentide are shunt or compound wound, direct current motors, fed from common busses with separately excited fields, also dealt with collectively, that is, are on common busses.

The source of common supply may be the usual

direct current supply in the case of a mill having this source of power; a separate D.C. generator may be installed, or, again a motor-generator set may be used where A.C. supply is produced only by the prime movers.

A separate motor-generator set or generator may be used for each paper machine, or a common supply for several machines with a special booster set for each machine.

Where moderate speed range is required by all the machines in the mill, the whole of the motors might with advantage be supplied by common busses, and the entire speed variation be accomplished by shunt control of the motors collectively, the Inter-lock dealing with each motor specially and harmonizing common voltage supply and particular speed required.

A light master shaft (1½" diameter at Laurentide) runs the full length of the paper machine. This shaft may be located in any suitable place, above the floor, on the floor, under the floor, or in the floor. A visitor to the machine room at Grand'Mere will have difficulty in finding it at all. At every section of the machine a spur shaft is driven from this master shaft through a ball bearing bevel gear box, the small bevels running in an oil bath. Each motor through a cone or expanding pulley drives a second spur shaft supported in ball bearings, both spurs terminate in a differential gear box, the one spur is an index of the speed of the master section, the other is a correct and accurate speed index of the section motor speed in each case.

At this point, I would like to repeat once again. The only way to transmit power by a belt is by having a difference between T and t. If there is not any difference in the tensions no power can be transmitted. If there is a difference in the tensions between the two sides of the belt such as is met with in power transmission the ratio of stretch and slip will vary between full torque and no torque about three per cent. But, if "T" is the same as "t" the stretches are equal, and the slip is zero. Such is the case with the Inter-lock pilot belt. It is not called upon to transmit any power at all, except what is required to drive a 1½" shaft a foot or so long, in two ball bearings, and what torque there is remains for all practical purposes constant. The belt is able to deal with any torque met for this tiny duty a thousand fold, therefore:—(in the case of the Inter-lock) "T" is equal to "t"; stretch 1 is equal to stretch 2; slip is zero; and so the spur shaft driven by the motor is a true and perfect index of the motor speed at all times.

Every differential comprises three movements, any one of which is the exact reflection of the difference in movement of the other two. In the case of a motor car the third member is a third shaft, the case being stationary; in the case of the Inter-lock, the third member which reflects any difference in speed between the two spur shafts is the differential case itself.

To return to description; (see Fig 6) the master shaft A runs the full length of the machine, and has at the side of each section, a bevel gear box B, and a master spur shaft C inserted. Now, it will be clear that as all these master spur shafts are gear connected to the common master shaft, they will all run at exactly the same speed as the master shaft at all times, granted equal gears.

Each master spur terminates in a differential gear box D, such as is used on every motor car, another spur shaft E, terminates in the other side of the differential gear box but in this case the spur is driven by section motor F. The case is supported by the two shafts C and E and is free to move and indicate any angular variation of the two shafts.

Now so long as the motor makes the same number of revolutions per unit of time as the master shaft, the motor driven spur will make the same number of revolutions as the master spur, (granted the draw control belt L is set for equal diameters of cone pulleys H) and if the motor makes the same angular speed in degrees per unit of time as the master shaft, then the motor driven spur will make the same number of degrees movement as the master spur and there is no tendency for the differential case to move at all. So long as the two spurs move at the same angular speed, the case of the differential cannot be moved, except by such force as will strip the teeth of the differential gear. We see, therefore, that the differential case is a complete and accurate reflection of the difference in speed between the master and motor spurs, no matter if this difference in movement can be measured in revolution or only in degrees, regardless of time; so, if in any period of time the motor spur has moved out of synchronism one degree, the case of the differential will have moved one-half on one degree.

Shunt regulators G (I understand called field rheostats here) are used in conjunction with the differentials, and the combination of these elements holds in relative synchronism the speed of each motor in relationship with the master shaft. The effect of a shunt regulator is so well known that there is no need to describe effect of same here.

The arm of the shunt regulator G in circuit with each section motor is mounted on the case of the differential gear D, and one revolution of the differential gear case will move the arm of the shunt regulator one complete revolution, or in other words from minimum speed setting to maximum speed setting of the motor; this speed variation control may be as much as 100% of the normal motor speed, that is to say one revolution of the differential case and therefore one revolution of the shunt regulator arm will have swung the motor speed from slowest speed to double this speed.

This powerful control is used to synchronize the

motors with the master shaft; in operation, the differential case is almost stationary, therefore, as must be the case, the master and motor driven spurs make the same speed exactly, which is the desired result.

Comment and Reply

There would appear to be some difficulty in understanding the synchronizing feature of the Inter-lock, and it seems to me that it would be helpful in understanding this feature if I quoted what one man has written and then to answer it. In an article dealing with sectionalized drive some months ago, was written:

"There are several types of sectionalized drives on the market * * * which have some form of speed governor which cannot act until a change in speed has actually taken place, in other words, something must happen before it can be corrected and there is a possibility of breaking the sheet, before the governor functions."

Now let us look at this matter together; let us see if we can find the difficulty that this engineer has. Let us see if we can show that he is worried without a cause.

We have seen that a single belt drive on a section may with a change of load as little as 20% causes a draw change of 100 to 200%; sometimes the paper breaks, sometimes it does not. Now let us see how the Inter-lock behaves. The motors are controlled in speed by shunt rheostats operated by the sensitive differential gear which reflects on the regulator any tendency to get out of step, by any motor, not in revolutions, hardly in degrees, 360 of which go to the one revolution; the two shafts terminating in the differential gear box, one geared to the master shaft, and the other as good as geared to the motor, will make the same number of revolutions per second, per minute, or per day. The one is a correct reflection of the revolutions made by the master shaft, the other of the motor to be controlled. If the master spur has ticked off on a cyclometer dial during a continuous run of the paper machine one million revolutions, the corresponding motor spur shaft will also have ticked off one million revolutions plus or minus one depending which is phasially in advance; that is, if the cyclometer dials are accurate. Dials register only one complete revolution. How can it be otherwise, for if the differential gear case moved one revolution, the motor would in such period of time have doubled its speed, and for every revolution of the differential case, the motor would have varied in speed 100%, the motor swinging between a normal speed and double speed per revolution of the case. Certainly no paper could be produced under such wild conditions. No, that shunt regulator arm is securely locked in space—not astronomically speaking—also the differential case, and so, the master and motor spurs run at the same speed exactly; in other words, are synchronised, and so the motors also are compelled to run in synchronism with the master shaft and so with each other. Let us see why. The contacts on the shunt regulator are relatively few in number. If there were a million speed contacts, it would not be possible on any one contact to obtain such speed synchronism as mentioned, such equilibrium, as would give the cyclometer dial readings as mentioned above between the two spur shafts, and so the regulator arm quietly "breathes" a few degrees in between two neighboring contacts.

No contact on a shunt rheostat could give 100%

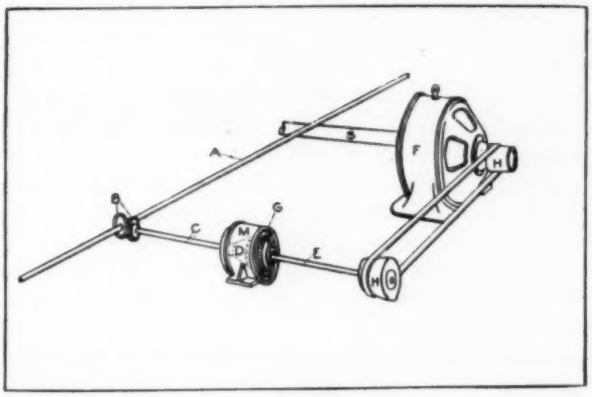


Figure 6

Diagrammatic arrangement of Inter-lock; showing master shaft A; spur gear B; master spur shaft C; motor spur shaft E; differential gear D, connecting C and E; gear housing M carrying contact circle of shunt regulator G (regulator arm is carried by differential case); sectional motor F; dryer driving shaft S; and cone (or expansion) pulleys H connected by belt I, which has only to turn shaft E in its ball bearings. It is the setting of this belt which controls changes in draw up to 20%.

speed perfection, and so the regulator gives this in effect by using electrically a selection of two contacts to get exact speed synchronism.

Suppose the master shaft to be running at 500 revolutions exactly, and that it is desired to run the motor at 500 revolutions as well, suppose that the setting on the cone pulleys was 50/50 or midway position, then the spur shaft would run at 500 revolutions as long as the motor driving it ran at this speed. The brush on the shunt regulator lies electrically on a contact at an instant which would give say, a speed on the motor of 525 revolutions; this is too high a speed, and so the brush actuated by the movable case of the differential, moves a few thousandths of an inch away from this contact. The new position says in effect to the motor, you shall run at 475 revolutions. This immediately starts the brush on its return travel a few thousandths. It is then told to run at 525 revolutions again and so it returns a few thousandths of an inch back to the 475 revolutions stop. In practice it is very difficult to see this operation with the naked eye, the movement is so small, but electrically that is the effect, the motor actually running at the desired 500 revolutions all the time.

It is not a case of the motor running for a few seconds at 475 revolutions and then a few at 525

revolutions; that is clear, for if such was the fact the case would be running at the difference in speed in one direction or another, but we have seen that the differential case is for all practical purposes stationary; the electrical effect is to give an average field on the motor which exactly corresponds to the 500 revolutions desired without any speed fluctuation at all.

Now let us examine a change of load conditions. Let us take say 20% load increase the same as taken with the belt. We have seen that such a load variation could make a speed change of 1% or a draw change of 100 to 200%.

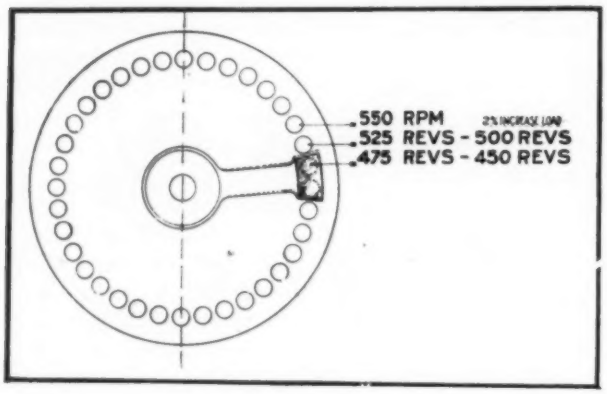


Figure 7

A normal adjustable speed motor controlled under similar conditions might vary in speed anything from 1 to 6% depending on the portion of the paper machine range of speed it was operating under, or in other words might be six times as sensitive as a belt under normal average behaviour.

Let us assume 5% change in speed tendency and trace the operation out through the Inter-lock control.

We have seen the motor shunt regulator slowly moving between two contacts and giving a speed of 500 revolutions per minute; now the motor tries to run at 5% less speed or in other words at a speed of 475 revolutions.

Under the old condition we had two contacts on the shunt regulator, which at that load give speeds of 475 and 525 revolutions, respectively. Under the new condition of load these two contacts would become respectively 450 and 500 revolutions contacts, so, theoretically we have a condition where the brush arm would, with the change of load, remain quietly on the higher speed contact.

In practice, such a state of equilibrium never exists but the brush arm would lie a tiny fraction of its time electrically in connection with the old 475 revolutions contact, which is now a 450 revolution contact, and the majority of its time electrically in connection with the new 500 revolution contact, or, it would decide to move between the next higher contact and the 500 revolution contact and there remain until the conditions varied again.

The effect on the motor is like that on a synchronous motor, in regard to its fellows; it has moved a few degrees out of phase, and then rested so much out of phase with its fellows but the periodicity of turning is exactly the same before, during and after correction. Direct current motors are made to behave together exactly as synchronous motors with any one setting of draw, but any draw can be obtained by moving the belt on the motor speed index pulley (H in the diagram).

Now let us examine how change of draw is achieved. We desire the motor as indicated first to run at 501 revolutions instead of 500, the belt is shifted on the motor, and motor spur cones in a way that would tend to make the motor spur run 1 revolution per minute slower, the regulator arm would according to the law of the differential try to run at one-half a revolution per minute slower than previously, but this would bring the arm first of all electrically in connection with the 525 revolution contact which is too fast, and so in effect what happens is that no change is observed by the eye on the differential arm, but actually it pauses a little longer electrically on the 525 revolution contact and a little shorter on the 475 revolution contact and the speed of the motor driven spur is still the same but the speed of the motor shaft is 1% faster than before, i. e.: the motor is now running at 501 revolutions, whereas before it was running at 500 revolutions. The naked eye cannot see any change of position of the regulator brush at all, but a speed counter will show the motor running 1/5 of one per cent faster than before; the motor will continue to run at exactly 501 revolutions for all time so long as the belt setting remains the same and the master shaft runs at 500 revolutions.

If the master shaft is varied in speed 10% which is accomplished by deliberately changing the speed of motor which drives this shaft, every motor will vary its own speed 10%, and the proportional speed relationship of all the motors to each other will remain just as before, exactly as before, and the draws will remain constant in percentage although the speed of the paper machine as a whole has been changed 10%.

On the No. 8 Laurentide machine with paper web for the first time passing over the fourth press only, at about 600 feet per minute, the word went to the control room—"1,000 feet," the speed rapidly rose, draws remained untouched, and the catenary of the paper between presses indicated no change of sag or tightness, things went on merrily until the strainers overflowed from some cause unknown to me—I am not a paper maker—and the stock gave out at a speed of about 950 feet per minute, then of course the experiment stopped. Since then 600/700 to reel.

I think we have dealt with our engineer friend's difficulty (of snapping the web due to functioning of

the governor), but if any point has not been made clear, I shall be glad to answer questions.

It may be said that such a degree of perfection is not necessary. We have seen how crude the mechanical drive of a paper machine is when analyzed, but what does such perfection of speed control mean to you? It means dollars and cents. It means less stoppage, less "broke," the possibility of producing paper to a keener specification, the possibility of producing paper at a higher speed; paper to the same specification from cheaper materials; a more uniform paper—a more uniform quality of the product in every respect.

Let us suggest to those of you who carefully analyze conditions that you try different draws per section along with microscopic and other analysis of stock. You know now that the draws will be constant, and see which draws produce the best results.

On old machines you will be able to creep up in speed inch by inch, limited only by the mechanical conditions of the paper machine itself.

One day, a dear old man said to me: "Yes, I would like an Inter-lock between the dryers of my machine and the calenders, that is where most of my broke is made." But as in the human body, the trouble does not always express itself at the original place of error. The origin of his trouble might easily have been between the couch and the first press where undue strain had crept in unobserved and only showed up at the calender.

Some Additional Interesting Phases

I am particularly conscious of my sins of omission but I have come to the conclusion that in order to deal fully with the subject of sectionalized driving one would require to write, not a paper, but a book. There are many interesting phases of sectionalized driving which I have not even mentioned as yet which you may wish to consider and discuss, and if I have not taken up too much of your time already I would like to throw forward a few thoughts which may bring forth interesting discussion.

A well known engineer (connected with a firm of machine builders) told me some little time ago that he did not consider high speed news machines would be a paying proposition, because the h.p. taken for driving high speed machines must be in proportion to the square of the speed.

Let me say at once—I am not contributing hereby to your fascinating subject of discussion, Speed vs. Width. The same remark would appear largely common to both types—fundamentally I suppose the man quoted is right, because the wire is longer on H.S. machine—more suction boxes—more presses—heavier presses, at least twice, and may be three times the weight of dryers, collectively these mean approximately double power demand per unit of speed as compared with an ordinary machine. Nearly 1,000 h.p. has been indicated in practice on mechanically driven machines running at nearly 1,000′.

The new mammoth Laurentide machine at 600 feet takes 1.26 Motor B.H.P. per inch of width.

From data collected of single motor drive machine, it would appear that the average H.P. of a news machine mechanically driven at 600 feet per minute is about 1.97 B.H.P. per inch of width.

The mammoth machine actually takes less power per inch of width than the average small machine. Taking weight of machines into consideration, we find the average mechanically driven machine takes approximately three times as much power per inch of width as the Laurentide machine.

The power cost bogey has had its sting withdrawn by a combination of good workmanship and design combined with sectionalized driving; these two factors are combined together, and cannot be separated, so, we cannot have the pleasure of knowing precisely how much to contribute to one and how much to the other; the results, however, are little short of staggering.

Another interesting feature which claims attention in connection with the starting up of high speed News machines is the enormous torque required to start the dryers turning. At Laurentide the torque required was equivalent to 1,000 H.P. torque, the running load of the dryers at 700 feet as low as 40 H.P. That is to say the starting load is no less than 14 times as much as the estimated running load at 1,000 feet. This starting torque worked out gives coefficient of friction at start as that generally used for metal on metal dry; there is evidently no oil at starting to help—all oil cleared away by combination of pressure and temperature. A mixture of oil and graphite might help starting condition.

Smaller machines would appear from calculation not to have such fierce starting torque as compared with running torque.

Another interesting feature was that when the dryers were turning round very slowly they had torque equivalent to 550 H.P. which would appear to show that the oil was not getting into the journals until the speed rose to some reasonable figure.

If I had been reading this paper in England instead of in Canada, I need hardly say one of my prime duties would have been to deal with steam engines first, but over here one is apt to take motors for granted. Here you are so spoiled by nature that you can with reason talk of electricity as a means of raising steam.

Friction clutches and all their attendant troubles are avoided by sectionalized driving. I wonder what form of friction clutch would have started the Laurentide dryers.

I think we shall be able to show that shutdowns are less frequent. Fire and life hazards are certainly

less. Ease of control by push buttons to inch the dryers or the press rolls when washing felts are things that want to be experienced to be realized.

Those gentlemen who would have a basement, at any rate can have the basement for whatever purpose they like, because it is free from any drive entanglements.

Vertical belts we know are bad—they are eliminated.

Cleanliness is at its maximum.

In the case of a "jam" at the calenders, there is a button available to reverse the calenders instead of having to use violent mechanical instruments to get the rolls turned round; e. g., pinchbars.

It is suggested that you may be able to use less sulphite and so save running costs thereby.

In conclusion I would just like to say that sectionalized drives are equally applicable to book machine as to news, to tissue machines as to Kraft, and that the demand for sectionalized drives did not arise from high speed news machines, because sectionalized drives were in demand years before high speed news machines were thought of, certainly before they were talked of.

Cost Accounting Fundamentals

By B. E. HUTCHINSON
American Writing Paper Company

Presented at Quarterly Meeting of the Writing Paper Manufacturers' Association in Chicago, on January 27, 1921

REPRESENTING the Cost Association of the Paper Industry, I wish to express my appreciation of the recognition which you have given the work we have been doing by setting aside today so large a portion of your program. Frankly I feel the recognition is deserved and has been earned. A great deal of serious work has been done throughout the industry during the past two or three years in the development of cost work. I am not going to waste this precious time by attempting to review it —the facts speak for themselves, and most of you are familiar with them.

Neither am I going to spend time today in presenting to you any elaborate discussion of the various interesting technical aspects of cost and accounting work. With a few notable exceptions, there is no one here interested in accounting as a profession. This is a meeting of paper manufacturers, and as such I take it you are interested only in the broadest aspects of accounting and cost work, and more particularly in their application to the conduct of the paper business. The few remarks I make will be based upon such an assumption, bearing particularly in mind that a free and frank discussion among ourselves of some of the issues involved will be of vastly more benefit than any contribution I am personally able to make upon the subject.

Accounting has been defined by someone as the systematic recording of facts. You will observe that according to this definition it is impossible to differentiate between "cost" and so-called "general accounting" or "commercial accounting." As a matter of fact the only distinction between them is of degree and not of kind. General accounting or commercial accounting deals with a business as a unit, as a whole. Cost accounting proceeds a little farther, and analyzes the business by its products. Such analysis may proceed along either one of two directions, and should proceed correlatively along both, viz., an analysis of the operation of the business by departments, and an analysis of the business by products manufactured.

In application, these two lines of inquiry differ somewhat in their general purpose, although the line of cleavage is far from distinct. An analysis of the operations of a company by departments is of value chiefly in that it furnishes a sound basis for the criticism of the manufacturing costs as well as of the efficiency of the various departments. The accurate knowledge of the labor costs in each department, the pounds of coal per pound of paper, the percentage of broke in each finishing department, and dozens of items of similar character undoubtedly contribute mightily to good management, particularly when they are compared, month by month, item by item, and progress is noted or retrogressions are investigated.

Any attempt on my part to enter into a detailed discussion of either commercial or cost accounting would run us into a very extensive category, and many differences of opinion would be developed. It seems to me, therefore, that progress immediately lies in restricting our discussion within the broadest possible lines and trying to find as many fundamental points of agreement as possible.

Exhibit No. 1 gives in the merest outline an operating statement which is suggested as applicable to the paper industry and as meeting the demand of good accounting practice. The item of Net Manufacturing Cost appearing in Exhibit No. 1 is still further analyzed in Exhibit No. 2 and furnishes the barest skeleton of a cost system. The application of the principles set forth therein to the manufacturing conditions of any particular mill is a highly technical

problem, and is strictly within the province of the cost accountant. As both exhibits speak for themselves I will not discuss them in detail now, but will be glad to answer any question that may subsequently arise.

Successful industry is generally predicated upon a sound sales policy, and the management of industry frequently finds its sales problems to be more difficult of solution than the technical problems relating to the control of manufacturing operations. To these problems departmental costs and efficiencies can contribute but little. Here information is required on the relative costs of various products and the relative costs of the same products under varying conditions of raw material markets and labor costs. Neither is it sufficient for the accountant to restrict himself to the customary role of historian of the past, the "recorder of facts," but he must so present his facts that they may be intelligently applied to the consideration of the problems of the future, because the success of an industry depends not upon hindsight, but upon foresight. Our position tomorrow is determined by the sagacity which we apply to the solution of the problems of today, and our experience of yesterday is of value only in so far as it can be made to contribute to the wisdom displayed in laying plans for the future.

We have already observed the importance of sales in the successful conduct of an industry, and whatever may have been the experience of the immediate past, the time has now come when no sale is made without consideration of price as playing an important part in the negotiation. This is a factor upon which cost accounting can throw considerable light. It cannot be denied that, for competing

EXHIBIT NO. 1

COMMERCIAL OR GENERAL ACCOUNTING

Suggested Operating Report

GROSS SALES TO CUSTOMERS		$0,000,000.00
Less: Freight and cartage allowed	$0,000.00	
Returns and allowances	0,000.00	0,000.00
NET SALES TO CUSTOMERS		$0,000,000.00
NET MANUFACTURING COST		0,000,000.00
Gross profit		$0,000,000.00
Packing and shipping expense	$0,000.00	
Selling expense	0,000.00	
General administrative expense	0,000.00	0,000.00
NET MANUFACTURING PROFIT		$0,000,000.00
OTHER INCOME—		
Discount on purchases, interest on bank balances, etc.	0,000.00	
INCOME CHARGES—		
Interest on current borrowings, allowance for bad debts, cash discounts allowed, etc.	0,000.00	
Net total		0,000.00
NET OPERATING PROFIT		$0,000,000.00

manufacturers individually, the price at which a competitor may be willing to sell plays a vastly more important role than the cost of production at any particular plant; or, put in another way, sales generally must be made at the "market" regardless of cost, and yet upon examination this anomaly is more apparent than real. The so-called "market" is in the last analysis determined by cost. To sell regardless of cost is to invite ruin and court disaster, and when indulged in extensively carries its own remedy. If this fact can be recognized at the beginning, and the conduct of industry regulated accordingly, much bitter experience may be avoided. Cost accounting, practically applied, offers safer and saner council than "cut and try" experience.

Of what is a fair selling price composed? Broadly speaking, its elements divide themselves into two groups—the net manufacturing cost and cost above net manufacturing cost which includes a variety of items. In Exhibit No. 3 an attempt has been made to enumerate these items.

EXHIBIT NO. 2

SUGGESTED SCHEDULE OF ITEMS TO BE INCLUDED IN MANUFACTURING COSTS

MATERIAL COSTS:

(1) Raw Materials—All fibrous material entering into the production of paper.
To be charged direct to production.

(2) Process Supplies—All supplies used directly in manufacturing, such as filler, size, color, bleach, etc.
To be charged direct to production.

(3) Conversion Supplies—All supplies not used directly in the manufacturing of paper, such as felts, wires, coal, lubricants, sundry supplies, etc.
To be charged to departments.

CONVERSION EXPENSE:

(1) Labor—Departmentalized for cost accounting purposes.

(2) Mill Overhead—
(a) Taxes: Other than Federal Excess Profits and Income Tax.
(b) Insurance.
(c) Sundry Manufacturing Overhead: Superintendence, purchasing, traffic, cost, engineering, employment departments, repair and maintenance expense, etc., etc.
All mill overhead items to be distributed to departments on some equitable basis.

(3) Depreciation: To be distributed to departments.
All conversion expense to be charged to production. Departmental rate method suggested.

TOTAL: Gross manufacturing cost.
Less—Broke recovered. Credit to production cost and charge to raw material inventory.
RESULT: NET MANUFACTURING COST.

However, the practical application of any generalities such as are exhibited here presents a problem of its own and may easily affect materially the solution arrived at. May I take just a moment to comment upon these generalities?

I hope you will not consider me facetious if I remark that raw material is not always found to be worth what has been paid for it. We hear a good deal today about "cost or market, whichever may be lower," but from a manufacturer's standpoint when considering a selling price there is something to be said for cost or market, whichever may be higher." Academically speaking, no manufacturer desiring to avoid speculation should be committed for more raw materials than are necessary to clean up his order book, and when the millennium arrives, when customers no longer cancel orders, when unlimited supplies of necessary raw materials are always available for prompt shipment at fair prices, perhaps it may be possible to conduct a manufacturing enterprise without indulging in speculations in raw materials. Perhaps, but not now. In the meantime it is excellent to bear in mind that "one swallow does not make a summer," and that one low quotation does not mean that trading in volume can be accomplished on so favorable a basis. Of course, to the astute belongs "the bacon," and the manufacturer having on hand in a declining raw material market the smallest surplus of material will be in an advantageous posi-

tion to establish lower selling prices without loss to himself. However, as a word of obvious caution, be sure that a selling price is always based upon raw material costs which will bear the strain of volume trading.

With the exception of material cost, upon which we have just commented, I do not believe that there is anything under the caption "Net Manufacturing Cost" which can be considered contentious in making up the selling price estimate. It is largely a matter of fact.

EXHIBIT NO. 3

SUGGESTED SCHEDULE OF ITEMS TO BE INCLUDED IN SELLING PRICE ESTIMATE

NET MANUFACTURING COST:

(A) MATERIAL COSTS: To be priced at cost or market, whichever may be the higher.
- (1) Raw materials.
- (2) Process supplies.
- (3) Conversion supplies.

(B) CONVERSION EXPENSE: On prevailing or anticipated basis, whichever may be the higher.
- (1) Labor.
- (2) Mill overhead.
- (3) Depreciation.

COST ABOVE NET MANUFACTURING COST:
- (1) Packing and shipping expense.
- (2) Reserve for adjustments on sales—Returns and allowances.
- (3) General overhead items.
  - (a) Selling expense.
  - (b) General administrative expense.
  - (c) Income Charges—Interest on borrowed money, etc., etc.
- (4) Profit—Interest on investment.
- (5) Inoperative contingency.
- (6) Reserve for inoperative departments.
- (7) Cash discount, if any.
- (8) Freight and cartage allowance, if any.

Some consideration can, I believe, profitably be given to the items which must be taken care of in addition to the Net Manufacturing Cost and the principles under which these various items should be applied to the estimating of a selling price of an individual item.

Some may prefer to consider Packing and Shipping Expense an item of manufacturing cost and place it in the first group. There is no particular objection to this under some circumstances, but when a large variety of Packing and Shipping Expense is incurred, such, for instance, as when paper from the same mill is shipped in bundles, rolls, cases for domestic trade, and zinc-lined reinforced cases for export, it would seem desirable to keep this item separate and distinct from manufacturing cost and to consider the expense incurred for these different packings an item of the General Overhead Expense. In making up the selling price estimate for any particular item, however, the actual cost of the packing required would be used in determining the selling price in question and this would apply regardless whether Packing and Shipping Expense be considered as an item of Manufacturing Cost or as an item of General Overhead.

It is suggested that a reserve for Adjustments on Sales (returns and allowances) be set up on a percentage basis.

Cash discounts and Freight and Cartage allowances, if any, can readily be determined for any particular item and it is important only that they receive proper consideration in determining the final selling price.

This leaves for further consideration the items enumerated under "General Overhead"—Profit, Inoperative Contingency and Reserve for Inoperative Departments. The proper application of these expenses in the determination of a selling price per pound or per ream, as the case may be, presents a somewhat complicated problem and several methods of solution present themselves.

Take, for example, the problem of profit. Basically a fair profit is a function of the investment, interpreted in the light of the risk involved in this business. It must not be overlooked, however, that this profit should properly "average out" over a period of years, and in determining the amount of profit to be asked on any one sale, or made in any one month, the instability of this business must be recognized. A study of Mr. Naylor's charts shows that orders are very likely to be either a feast or a famine, and the feast must furnish the fat to carry us through the winter of famine. The same argument applies to overhead expenses which run on regardless of manufacturing schedules. Of course, these remarks are of interest only to those of us who are so unfortunate as to be short of orders at times, and do not apply to manufacturers who during the last five years have never had occasion to shut down a machine for lack of orders and who feel confident that the same enviable record can be maintained during the next five years. Many of us, however, know by experience that there are contingencies against which it is advisable that reserves be provided, and this provision can be made only by getting a price which will cover them during those periods in which there is a market for paper. Personally I am persuaded that the several such contingencies enumerated in Exhibit No. 3 are worthy of consideration every time the establishment of a selling price is contemplated.

EXHIBIT NO. 4

COMPARATIVE SELLING PRICE ESTIMATES

Operating Basis: 500 Productive Machine Hours per Month

	Basis of General Overhead and Profit Charged to Individual Item Per		
	Machine hour	Mfg. Cost 80%	4c per pound
	$20.00	sales price	
Item No. 1:			
Manufacturing cost	$ 16.00	$ 16.00	$ 16.00
Net production per machine hour	500#	500#	500#
Sales price	20.00	20.00	20.00
Gross profit per month	10,000.00	10,000.00	10,000.00
Item No. 2:			
Manufacturing cost	16.00	16.00	16.00
Net production per machine hour	400#	400#	400#
Sales price	21.00	20.00	20.00
Gross profit per machine hour	20.00	16.00	16.00
Gross profit per month	10,000.00	8,000.00	8,000.00
Item No. 3:			
Manufacturing cost	16.00	16.00	16.00
Net production per machine hour	600#	600#	600#
Sales price	19.33	20.00	20.00
Gross profit per machine hour	20.00	24.00	24.00
Gross profit per month	10,000.00	12,000.00	12,000.00
Item No. 4:			
Manufacturing cost	12.00	12.00	12.00
Net production per machine hour	500#	500#	500#
Sales price	16.00	15.00	16.00
Gross profit per machine hour	20.00	15.00	20.00
Gross profit per month	10,000.00	7,500.00	10,000.00
Item No. 5:			
Manufacturing cost	20.00	20.00	20.00
Net production per machine hour	500#	500#	500#
Sales price	24.00	25.00	24.00
Gross profit per machine hour	20.00	25.00	20.00
Gross profit per month	10,000.00	12,500.00	10,000.00

There are at least four principles which may be

followed in the establishment of a selling price, though these give no recognition to the method under which Mr. Beckett tells me he successfully managed his business long years ago; namely, to double the price of rags and add two cents a pound for luck. May I enumerate:

First: A manufacturer may blindly follow the "market," and trust that his competitors know more about the cost than he does. It has the merit of vying in simplicity with the method reported by Mr. Beckett as in vogue long years ago.

Second: A profit of some arbitrary percentage of the cost or selling price may be assumed to yield the desired results, and be applied indiscriminately to all products manufactured.

Third: A profit of some arbitrary number of cents per pound is sometimes advocated as assuring an adequate return.

Fourth: Finally, and I trust I have worked up my theme to a climax, a certain amount may be determined as necessary income per machine hour in order to meet these overhead expense items, reserves, contingencies and profit, and the increment above manufacturing cost for any particular item calculated on this basis.

The first of the suggested methods can scarcely be considered worthy of serious discussion. The relative results obtained under the second, third, and fourth methods are shown on Exhibit No. 4 and seem to point conclusively to the superior merit of the machine hour method of estimating selling prices, since it appears to be the only method that assures an equitable profit on all items under the diverse manufacturing conditions met with in the paper mill.

The Cost Association of the Paper Industry is well represented here today and several of my colleagues are only waiting for an opportunity to take issue with me on some of my contentions. My particular responsibility was to furnish a basis upon which a discussion of cost problems could be started. I hope that I have been successful and that the time remaining for discussion of cost work will point the way to the Association for still further endeavor.

Personally, I cannot but feel that the field of greatest usefulness for the Cost Association lies in the direction of a closer study of the application of cost accounting to the estimating of selling prices. Our friends, the paper merchants, have come to a realization of the benefit to be derived from uniform cost accounting methods. If we, as manufacturers, could decide upon some uniform practice applying to the fundamentals of cost and accounting work, such, for example, as a uniform method of applying our overhead costs in estimating selling prices as illustrated in Exhibit No. 4, we would take a long step towards eliminating unfair and irresponsible competition which at times so seriously impairs the stability of our markets. For the manufacturers who are impressed with the possibilities of progress in this direction the Cost Association of the Paper Industry seems to furnish precisely the medium through which this problem can be most effectively solved, and if the Cost Association can make any substantial contribution to the progress in this direction its existence and continuance will be amply justified.

Grinder Room Efficiency

Changing the Pulp Stone

By W. A. MUNRO

GRINDER room efficiency at the present time is very much desired, and any ideas that will save time and increase the output are sure to be given every consideration and chance to prove their worth.

In some grinder rooms the greatest time lost is due to the necessity of changing stones. The pulp stones available for the past few years do not stand up as well as formerly. They have a greater tendency to flake out, develop sand pits and rough spots, all of which necessitates turning off and trueing up at frequent intervals. This procedure materially shortens the life of the stone and the amount of wood ground per stone. Some pulp stones will develop a crack clear across their face, and often a part of the stone, for no apparent reason whatsoever, will break out down to the flange, rendering the stone unfit for further use. To minimize this trouble have a supply of pulp stones on hand and allow them to season for at least a year in a place where they will be dry and protected from frost.

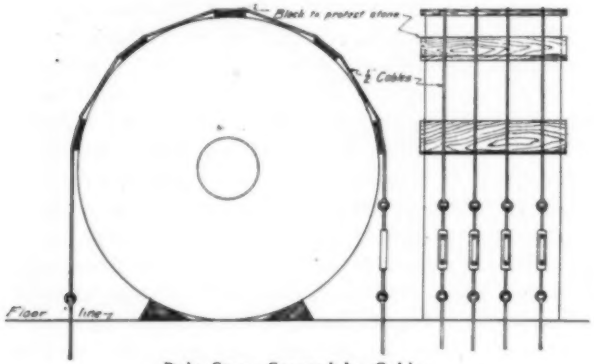
Much valuable time is saved by having an extra shaft with a pair of flanges that will fit in the place of the shaft on the grinder whose stone is to be changed. A stone should be hung on this extra shaft and held as a spare to be used only when it becomes necessary to change with a minimum of delay.

Even with an extra shaft available the following plan for changing a stone will save time and labor. The stone hung in this manner will also be in dynamic balance even if the bore of the stone is out of center, insuring more even running, no pounding, and a smaller oil consumption per ton of pulp ground. Less than two hours is necessary to hang a stone follow-

ing this method, while from ten to twenty-four are sometimes consumed by other methods such as centering on the circumference of the flanges, cementing the stone and waiting for the cement to dry, etc.

The stone is centered on the shaft by means of hardwood shims as long as the bore of the stone and about one inch wide. The bore of the stone and the diameter of the shaft are caliphered and the shims made of such thickness that they will make an exact fit between the stone and the shaft. They must be of sufficient number to fit entirely around the shaft.

A cross section of the stone, shaft and shims will appear as in the diagram, Fig. 1.



Pulp Stone Secured by Cables

Sheets of veneer are put in between the flanges and the stone to take up the inequalities between them. This veneer also aids in tightening the flanges on the stone. The best veneer for this purpose is made with a one-eighth inch bass wood center, and strips of hard maple one-sixteenth of an inch thick, glued on each side. The finished sheet should be some larger than the flanges, and the part that protrudes from under the flanges may be cut off with a cold chisel.

With one flange placed on the shaft so that the stone will come in the right position under the grinder frame, the shaft and flange is picked up by a crane or chain block, and the end of the shaft lead through the stone until the flange is within an inch of the stone. The stone should now be securely blocked or fastened so that it will be rigid and not roll. This can be accomplished very easily by having three pieces of half-inch cable with a turnbuckle attached, fastened to the floor and arranged so that the cables can be lead over the top of the stone and then tightened by the turnbuckle. Several strips of wood should be placed under the cable to prevent the cables grooving or marring the stone.

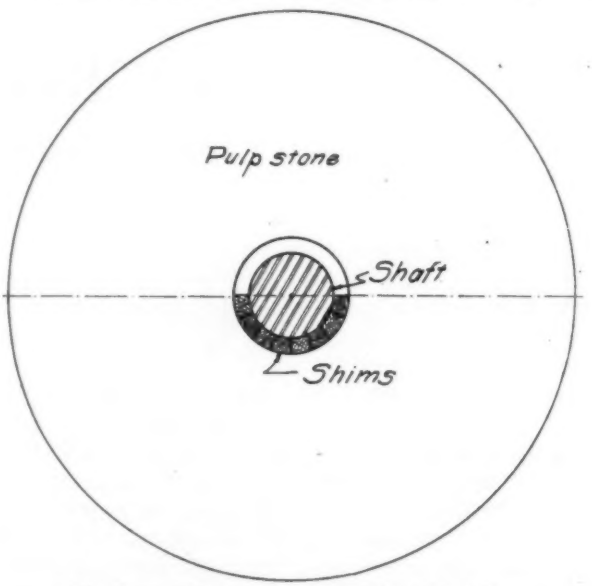
Fig. 2 shows two views of the stone when held from turning by the cables.

After the shaft has been entered into the stone, the end that has gone through is raised by means of a jack or chain block until the shaft is a little above the center of the hole in the stone; the other end is also raised until the shaft is perfectly level. Several shims are now put in on the bottom and part way up on the sides. The veneer is then inserted between the set flange and the stone and the shaft entered as far as it will go. The shaft is then lowered and allowed to rest on the shims which have been put in on the bottom. The shims are then put in completely around the shaft. It may be necessary to split the last shim to have a snug fit. Before the flange is put on, it is a very good plan to paint the shaft threads with a paste made by mixing heavy oil and graphite. This will help materially when it is desired to loosen the flanges when changing the stone at some future time.

The second flange is now put on the shaft and screwed up against the veneer placed between it and the stone. This flange should be screwed on very securely; an oak eight by eight about twelve feet long makes a very good lever for tightening on flanges, or an old railway rail may be used. The stone is now ready to be put under the grinder and to be coupled up.

If the quarries have drilled the hole in the exact center of the stone hardly any trueing up will be necessary. Not more than three-eighths of an inch has been cut off any stone hung in this way. However the greatest care should be taken to get an exact fit with the shims, and it often pays, if the time element is not being considered, to smooth out the bore of the stone. This will give greater accuracy and reduce the amount of stone to be cut off when trueing up.

Should it be desired to use the stone at once, the frame may be put on and bolted down. The cells should be kept about an inch from the stone. Square blocks of wood should be placed in the front and back pockets and the pressure foot lowered to within an



Side View, Showing Pulp Stone Shaft and Shims

inch of each block. A man should be stationed at each pocket and at a given signal the pressure foot should be allowed to come against the blocks and in that manner the flanges are so tightened against the stone that there will not be the slightest chance of its changing positions. The stone may now be turned down and the cells set close.

When hanging a spare or in low water period when there is plenty of time, tightening by means of wood in the pockets is not necessary. The veneer may be wet down with a hose or the stone when hung allowed to stand in the grinder pit, which has been filled with water until is up over the bottom of the veneer. The water, in several hours, will cause the basswood to swell to such an extent that there will be no necessity of tightening the flanges further.

When changing a stone that has been installed by this method, the grinder frame is tipped up, the old stone removed and placed where the cables can hold it from turning. There is no need of loosening but one flange, in fact it is a better plan to have one flange set tight on the shaft as that will insure the correct position of the stone under the grinder frame.

The flange to be removed should be heated near the threads with a kerosene torch. Care should be taken to heat it as evenly as possible around the hub to prevent uneven expansion and gripping on one side or the other.

The flange should now be loosened by means of the timber or rail used in tightening it on. It is a good plan, if a traveling crane is available, to chain around the end of the lever and to use the chain block in getting the flange started. When the flange has started to come off a shorter and lighter lever can be used to finish unscrewing the flange from the shaft threads.

Ventilation of Paper Mill Machine Rooms

By H. S. TAYLOR

Chief Engineer, Management Engineering and Development Co.

Presented at the Annual Meeting of the Technical Section of Canadian Pulp and Paper Association, on January 20, 1921, at Montreal, Canada

THE problems of heating and ventilation of structures designed for the accommodation of the human being, either as a place of residence, travel, toil, or for recreation, have from early periods received much intensive study, and as a result the heating and ventilating engineer of today is in position to specify a most efficient installation, whether it be a simple hot air equipment for the modest dwelling or the complicated system of air handling equipment required to ventilate the many miles of subway and tubes in and about the largest city on the continent.

In selecting the two illustrations as above mentioned, you will note that in the case of the modest dwelling, the requirement is one of heating, whereas for the subway it is one of ventilation. The underlying principles of these two requirements, however, are the same; and in many installations the objective of the one single operation is both heating and ventilation. Take for instance the modest dwelling, the objective is to replace the volume of air within with a like volume containing heat units of a number sufficient to raise the temperature, and hold it to the desired temperature, and, further, this replacement of air change, we will call it, must be even and continuous; the rooms must therefore be ventilated giving the desired circulation, making an air change possible. A simple test of this statement is to shut tight the door of a room in which there is a connection from the hot air furnace and note that so long as the room remains tightly closed, heating effect is barely noticeable.

In the case of the subway the objective is to remove heat units and foul air, through the supply of fresh air and its subsequent removal laden with its burden; in other words, the one operation is simply the reversal of the other. With the dwelling the air change is, you might say "driven" from the heat of the air itself, whereas in the subway powerful blowers and exhaust fans maintain the circulation and resulting air change. Should heat be required during the colder periods, it is only necessary to heat the incoming air to produce the desired temperature thus covering the two requirements in the one operation. Air then is a medium for the delivery or removal of heat, moisture, or impurities, and this property of our atmosphere is, I believe, the solution of the problem set forth by the subject of this article.

Conditions in Paper Mill Machine Rooms

A personal tour can be made through the factories of many of the big industries of today and conditions as regarding heating and ventilating found good, or at least fair, that is until we come to the most important department of one of the leading basic industries; namely, the machine rooms of paper mills, and their general characteristics are to a great extent the same for almost any grade or volume of production. Conditions in these machine rooms we find in

general not even fair, and in many, extremely discouraging; intense heat, seemingly the more intense from extremely high humidity; in many cases the roof and wall saturated and dripping, and the air thick with vapor. The visitor, if he is not accustomed to paper machine rooms, generally loses interest about this time and beats a hasty retreat through a doorway in opposition to the outside air that is attempting to gain admission in much larger quantities than the size of the opening will permit—and I might say that it would not be the least improbable that increased capacity of exhaust fans were being planned for in this particular machine room

to relieve the conditions that were causing loss in production on machines and general dissatisfaction among the men who must remain within the room.

The rush of air from the outside through door openings clearly indicates exhaust fan capacity as already over-sufficient and a condition of partial vacuum within the room. Exhaust fans are taking their supply direct from openings wherever existent in direct currents, and about and between these air currents a condition of partial vacuum may be said to exist, through which moisture laden air slowly arises to condense on unprotected surfaces above. In place of increased capacity of exhaust fans, this room is demanding an increased supply of incoming air. The demand is there, but the supply is not, and we all know from our earliest experiences that an ideal condition is impossible unless the condition of supply and demand is balanced, and I may say that in the majority of cases, to this failure to supply an adequate volume of incoming air, can be attributed the disagreeable and deteriorating conditions found in many paper mill machine rooms that are described by the visitor as "poorly ventilated."

With conditions as above outlined, a conclusion is at once arrived at, that the processes as carried on within these paper machine rooms must present features somewhat out of the ordinary from a heating and ventilating standpoint, and upon analyzing conditions as they do exist under normal operation, we find such a conclusion correct.

Let us take for example a two-machine room with a normal production of 100 tons per twenty-four hours —sheet going to dryers 33% dry and to reels ninety-five per cent dry. With this assumption we find that for each pound of production 1.95 lbs. of water is evaporated at dryers and for each 100 tons of production per 24 hours, a total of 390,000 lbs. of water or 270 lbs. per minute is discharged from dryer section and must be removed from the room in the form of saturated vapor; this in addition to the moisture rising from wire, flow-boxes, etc., that while low in quantity is also at low temperature and therefore practically at the dew point.

There will be in this two-machine room practically at the floor line approximately 15,000 square feet of dryer surface, under from eight to fifteen lbs. steam pressure, forming radiating surface sufficient inasfar as heat is concerned to heat a room of twice the volume under extreme low temperatures, and this radiating surface as mentioned above is practically at floor line.

There will be in this room approximately 23,000 square feet of floor surface—and a like amount of roof slab. There will be approximately 28,400 square feet of wall surface and 701,500 cubic feet of volume. Of the 23,000 square feet of floor surface, approximately 3,400 square feet may be open to basement, and of the 28,400 square feet of wall surface, approximately 3,600 square feet will be single thickness window glass, and 200 square feet openings into other rooms protected by fire doors, but open as a general rule.

With the foregoing conditions as existent within the room, the problem of ventilation is before us and heating must also be resorted to, not for the purpose of raising the temperature at the floor level, but to hold the temperature beneath the roof slab, and about the supporting structure and walls, above the dew point of the moisture laden air rising from the machine, and so saturated that but a few degrees difference in temperature will cause condensation. With low temperatures without, the underside of slab unless insulated will present its entire surface as a condenser, and the supporting structure and walls will act in a similar manner.

We find, therefore, that to properly ventilate this machine room we must, first, remove the volume of moisture laden air rising from the machine and replace the volume removed from outside sources, and second, insulate the under side of roof slab, roof structures and walls with air of a temperature that will be above its dew point.

Removal and Replacement of Air

There are two methods of removal that can be utilized; first, natural draft, and second, positive exhaust. Experience has shown that while natural

draft is serviceable for removal in machine room of low production, it has not the capacity for removal of the large volumes required under modern practice. We will, therefore, select the method of positive removal through exhaust fans. There are also two sources of supply for incoming or replacement air, in that it can enter through door, window or other specially designed openings, or can be delivered to room through a properly designed blower system.

For raising the temperature at underside of slab, roof structure and walls, there are two methods available; first, through direct radiation suspended from slab, and second, through heating the air delivered to replace that discharged through removal.

In summarizing, there are then two systems outlined; first, the system of positive removal and replacement, with the replacement air heated to the most efficient temperature, and second, a system of positive removal and either natural or positive replacement with direct radiation providing heat for insulation of roof slabs, roof structure and walls.

Natural replacement of air in the quantity required is not feasible, more especially so in locations of extremely low temperature. A machine room of dimensions as mentioned above should have normally a 7½ minute air change, or roughly 94,000 cubic feet of air delivered per minute, and openings in buildings to admit such a quantity would be, to say the least, undesirable, and further at low temperatures this volume of outside air would be extremely difficult to handle at floor level, even though sufficient direct radiation be installed under roof, to hold temperature above the dew point. We therefore are brought to the conclusion that positive replacement with mechanical blowers should be the method selected.

With positive removal and replacement, we then have the principle of subway ventilation as previously brought to your attention. In other words, a sweeping out of the room through the medium of air and the accompanying removal of moisture content. As previously explained, however, sufficient heat units must be delivered to hold the temperature of the moisture laden air above the dew point, and we have only to decide whether the necessary heat units shall be delivered through the incoming air or from direct radiation.

A system of direct radiation beneath roof, over an area of 23,000 square feet is an expensive installation and also difficult to maintain, due to moisture that must continually surround this installation. Furthermore, this system can be utilized only to hold the temperature to the desired point; it can not in any way act in the removal of the many tons of water delivered from machines, for this work must be done through removal and replacement. Therefore, so long as this removal and replacement equipment must be installed, let us supply the heat required with the volume of replacement air, and dispense with a costly system of direct radiation.

Comparative Costs

In order that there may be no doubt that in so doing the right principles are being followed, we will compare initial costs and operating efficiency of a positive removal and replacement system against that of direct radiation.

For the machine room as outlined, with a system of positive removal and replacement, approximately 94,000 cubic feet per minute of replacement air is demanded, equivalent to a 7½ minute air change based on a 5-minute change at dryer sections and 10-minute through balance of room. Heat required is to be introduced with this air, and with an outside

temperature of 20 degrees below zero it has been found from actual experience that approximately 2,400,000 B. T. U.'s must be supplied with this incoming air, and this demand is met with incoming air at a temperature of 84 degrees F. Heater coils should be of a size to permit heating to 100 degrees F., but except through periods of extremely low temperature 84 degrees F. continuous will give the desired results.

With outside temperature at 20 degrees below zero and incoming air at 84 degrees, approximately 9,900 lbs. of steam is demanded. Nine hundred lbs. for engine and nine thousand for heater coils. Ninety per cent of engine steam, however, is returned to coils so that net demand is 9,090 lbs. per hour, and this includes heat loss through roof, walls, etc.; for an outside temperature of zero the net demand would approximate 8,200 lbs., and for 60 degrees—960 lbs. per hour, equivalent to 300, 273, and 32 Boiler H. P. respectively.

A system of a total capacity of 94,000 cubic feet, with distribution system, steam and condensate connections, will cost today about $22,000 installed; this cost does not include exhaust fans, hood or up-takes, as this latter installation is required irrespective of the method of supplying heat. For the room in question, a figure of $220 per daily ton can be used for

estimating purposes. If hoods, exhaust fans, uptakes, etc. are included, this figure should be increased to $320 per daily ton.

To compare a system of direct radiation we must figure losses through surfaces, and then give an equivalent number of infiltrations to at least approach the air change that a fan system would give. These figures will show a total expenditure of 11,200,000 B. T. U.'s that based on 250 B. T. U.'s per square foot of surface per hour, would show a requirement of about 44,000 square feet of radiation, that based on one-quarter of a lb. per square foot would be equivalent to approximately 11,000 lbs. of steam per hour, or but a slightly higher hourly demand than that for the positive system. Losses through roof, however, with a system of direct radiation would increase this steam demand of 100%, due to the much higher degree of heat under the roof. With the positive system, air entering at 84 degrees would be about 80 degrees under roof, or with outside air at 20 degrees below zero a range of 100 degrees. With direct radiation close under slab, temperature will be very close to 180 degrees or a range of 200 degrees. Loss of B. T. U.'s through any surface is proportional to differential in temperature on either side, and loss through direct radiation would, therefore, be 200 per cent of loss with positive system.

Approximately 16,000 lbs. of steam would be used per hour with a direct radiation system, under conditions as stated for a net demand of 9,000 lbs. for the positive system, equivalent to approximately 533 Boiler H. P. vs. 300.

A direct radiation system as described above would cost today about $45,000 installed, or $450 per daily ton, over 100% greater than cost of a positive system.

My objective in the preceding paragraphs has been to take you step by step through the different phases of the subject in order that you may thoroughly understand the system that I believe to be practically and also theoretically the most efficient; and further, on two installations that I have been directly interested in, it can be proven, even with extremely low outside temperatures, that interior of machine room with normal production can be kept to an efficient working temperature, and with it a degree of humidity that will allow glasses to be worn on any part of the floor without moisture condensing thereon; and this I believe to be a very fair test, especially when entering a machine room.

Method of Removal and Replacement

We now come to the method of removal of air and also of replacement. There have been among certain mill owners serious objections to hoods over dryer sections of paper machines. These objections, no doubt, are due to interference from hoods and uptakes from machines, crane, etc., but it can be stated that with very few exceptions those mills that commenced operations without a hood were so equipped within the first year after commencement and this later installation was made with much inconvenience and additional expense. I believe, therefore, that the industry in general is convinced that a hood of proper design is desirable, and I can further state that from a ventilation standpoint it is absolutely necessary.

For a two machine mill, up-takes from hoods may be either horizontal through the wall, or vertical through the roof. For a machine room housing more than two machines vertical up-takes must be resorted to, and even with a two machine mill the vertical uptakes are preferable in that the discharge is direct and cost of installation less. There is no difficulty in providing a passageway for crane, and hood can be so designed that no interference is caused to any part of the highest speed machines.

For the two machine room in question three uptakes from each hood are recommended, of approximately 6 feet in diameter each. In four of these uptakes, exhaust fans should be installed and in the two up-takes at the dry end, one for each machine, either exhaust fans can be installed or this vent designed for natural draft. I have been interested in numerous installations where natural draft was used in this vent, and operation was perfect.

The fans for replacement of air should be of standard equipment selected in the case of the room in question, for approximately 95,000 ft. per minute delivered for the machine room only. Additional capacity must be allowed for basement or any other departments that are heated from this unit. It is customary to allow full in-take from outside air, but a damper installed in fresh air casing permits recirculation with extremely low outside temperatures, thus decreasing steam demand. This recirculation, however, is limited and is not allowable for air direct from the room in question in that the purpose of this system is thus defeated.

With a two machine unit including machine room, beater room, and finishing room, it is advisable to install two sets of replacement fans, one for each machine, rather than one unit for the entire requirement. Each fan can be designed to supply heating demand for its proportion of beater and finishing room, as well as one-half machine room requirements, but it is far preferable not to extend demand beyond machine and finishing room, as these fans are primarily for machine room, and if distribution piping therefrom is extended over a large area, the tendency will be to deprive the machine room of its proper supply.

The air of replacement can be distributed at any point of machine room. The proper distribution, however, is in the roof truss structure near the under side of roof slab. For a two machine room, one line of distribution at wall on either side, with two center lines, one on either side of center line of room is

recommended. All lines of distribution shall have openings directed both at the roof and vertically downward, designed to distribute approximately one-third of the volume to the under side of slab and two-thirds downward toward the floor. It has been stated that approximately 94,000 cu. ft. of air per minute is required for this machine room, and exhaust fans four or six in number, should be installed for a total of not more than 85,000 ft., thus producing a slight pressure within the room, the heated air being forced toward the floor level through pressure from the supply above, giving an even distribution downward, thus meeting the volume of moist air rising from the lower level, and sweeping it out under hood and through uptakes, together with the large volume of saturated air rising direct from the machine itself.

This condition of slight pressure is a most important feature, in that openings in floors or walls cannot in any way cause interference with the proper operation of ventilating equipment, whereas should this condition of pressure be changed to one of partial vacuum, through the capacity of the exhaust fans being greater than the delivery fans, a rush of air through any opening will result. This inrushing air during the winter season will be of extremely low temperature if from the outside, and if from the basement, will be laden with moisture in addition to its low temperature. Statements have a number of times been made to the effect that openings should not be left in the floor on account of interference with ventilation of the room. The actual cause of interference, however, was an insufficient supply of air to replace that demanded by the exhaust fans, and as previously stated this lack of sufficient replacement volume is the cause of a great percentage of the failures in machine room ventilating systems.

Should conditions be not as they should within the machine room, the immediate conclusion of course is that the moisture and heat are not being removed and in order to relieve this condition exhaust fans are speeded up. There will be a partial vacuum throughout the room, moisture arising from lower level, will ascend meeting roof slab, supports, and walls where condensation takes place with the resulting drip. Steam will curl out from under the hood due to insufficient circulation, and the room can be said to be in a very poor condition from a ventilation standpoint.

It may be that exhaust fans are operating under speed. This can be easily ascertained by speeding them up and observing if improved conditions result, but in the majority of cases the fault lies entirely with the incoming supply being insufficient to replace the volume demanded by exhaust equipment.

With a system installed as outlined, of positive blowers equipped with steam coils for heating the incoming air; with a properly designed distribution system under roof slab; with hood and uptakes equipped with exhaust fans operating at a capacity slightly under that of the incoming fans, a machine room is equipped with an installation that will properly ventilate the room, providing its operation is efficiently handled.

As previously stated, the action of this system of ventilation is to sweep out the room, freeing it of all moisture and excess heat. The moisture, it must be remembered, requires removal irrespective of the degree of outside temperature, therefore the air change within the room should be kept fairly constant summer and winter. For winter days of extremely low temperature, however, heat units delivered with the incoming air must be greatly in excess over that for a summer day where outside temperatures are much higher. The regulation of this system will therefore depend to a great extent on steam supply to heating coils, the fan speeds requiring very little attention. The regulation of steam to coils can be quickly mastered by the engineer in charge, through actual conditions within the room, as providing air change is constant condensation or vapor show steam supply insufficient, and if drybulb thermometer shows too high temperature, incoming air is being overheated.

Machine Room Construction

A word might be said here as to the effect of the type of construction of the machine room on its ventilating proportion with the system under discussion. It can be readily seen that with a low outside temperature, the incoming air must be heated to prevent condensation, and further, efficiency of the system must depend on the retention of this heat within the room; therefore, the lower the conductivity in the enveloping structure, the greater the retention of heat units, and what is more to the point coal in the bunker. Paper mills of any size are now built of fireproof construction, employing concrete, steel, brick or tile, except as regards roofing material, where wood has been the standard material to a great extent, and through a wooden roof the largest number of heat units are lost. For durability, fireproofing qualities and non-conductivity gypsum roofs are fast coming into use, and I may refer you to an article in "The Pulp and Paper Magazine of Canada" Volume XVIII (18) edition of July 8th, 1920, that describes the general qualifications of this type of construction for machine room roofs, it having a conductivity in comparison with wood roof of 3.21 to 4.61 and of concrete 3.21 to 13.8.

For proper lighting effect, especially for a room containing two or more machines, it is without doubt necessary to install sky lights. This sky-light area, however, should be held to a minimum due to the high conductivity of glass and resulting heat losses there through. Glass areas in the walls should be designed with a view of admitting sufficient light but no more. In a large number of paper machine rooms, window glass covers a large area and this large area is in inverse ratio to the size of the coal pile at the end of

the winter season. In other words, protect the interior of the machine room from outside temperatures to as great an extent as compatible with cost of construction. As an example an air space can be left in brick walls with little extra expense, whereas with a concrete wall an air space involves an expenditure that is prohibitive, but wherever air spaces can be left, insulating qualities are greatly improved.

In summarizing, the more insulated the building structure itself is against outside temperatures, the less steam is required for ventilating system, and the lower the cost of operation, and in locations where extreme low temperatures occur, and there we find paper mills of the greatest production, this heat unit retention is of the greatest importance.

There is one other condition that has a direct bearing on a system of ventilation such as described in this article; namely, a system of blowing heated air directly within the dryer section. There are a number of such systems on the market and they are an aid to increase production, in that steam within the dryer pockets is absorbed together with moisture from the sheet.

These systems have their value in the production of heavy sheets, such as board, pulp or wrapping, as the capacity of the machine is generally dependent on drying capacity, and any system that will give increased drying effect will thus increase production. It can readily be seen that the volume of air distributed by such a system can be deducted from volume required for machine room ventilation, in that volume of replacement air is simply a total of that distributed through a single or multiple system.

The description that has been given including general details is that of the system I believe the most efficient. Slight changes will be required for different mills, due to type of construction, conditions of exposure, space available for fans and other general characteristics that differ slightly in different locations. For the best results, the installation should be designed individually for location selected, and if the system is installed and operated properly, condensation and varying temperatures will disappear and in their place a clear atmosphere with even temperature at all seasons will appear; and such a condition is the aim of the operator; for the men whose working hours are spent at the machines; for the building that deteriorates rapidly when saturated with moisture; and last but not least for increased production itself.

Perpetual Inventory or Material Ledger

By HARRY C. BRADFORD

THIS book is called a Stock or Store Ledger. It is a very important book and should be kept by all mills. Some might say that it is a lot of red tape, but if it requires a lot of work, it is work well spent. Not only does this make it possible to balance the books each month, or make out an estimate Profit and Loss statement, but it shows just how much money is tied up in stock, and what the monthly consumption is. This enables the stock to be adjusted so as to not make it necessary to carry a large stock in order to have the material on hand when needed.

In order to reap the greatest benefits from the Stock Ledger, it must be kept continuously and systematically. In some places it is governed by a Controlling Account. It should also be checked occasionally with a Physical Inventory.

A Perpetual Inventory is one of the important features of every cost accounting system. There are two good ways of keeping these records, one is by a card system, see form one, and the other is by a loose leaf ledger sheet, see form two. Some prefer the card system. If the card system is used and a card is taken out, a dummy should be put in the file to take its place, with a record showing by whom it was taken and the date. This also works better in a small mill than in a large one. Some prefer the card system for supply items, such as brooms, pails, etc.

There are two general methods of determining the cost price. The method of using original prices is the best for store items or supplies. No great difficulty is experienced in operating this method. It means that the prices of the supplies first purchased are first used. This is illustrated in form one.

If there is any item like pulp or other material that has been bought under a certain contract, the original price method should be used.

The second method is the average price method. This method is preferred by some for materials like rags, pulp, clay, starch, size, alum, etc. Some may disagree on this. We might refer for a minute to rags. If there were used on a certain order rags that were received on an old contract which cost more than the ones received on a new contract; if the high price rags were used on a certain order of a certain grade, and the other rags for another customer on a little different grade, then to begin to compare the profit, it would be necessary to take into consideration the difference in price, which would make the comparison more difficult than if the same price or average price on both orders was used. This would also be true in similar cases on some of the other raw materials in these same orders.

Another kind of material where the average price method is far superior to the original price method is pulp, where the consumer pays the freight on the pulp. This makes every car cost a different price, as the wet weight of the pulp varies. This would make the same grades cost different as mentioned above, and would require additional clerical work to take care of it.

It will be found that most mills carry a monthly supply of rags, paper stock, pulp, etc., on hand so the account with each item needs to be balanced only once a month, and it consequently does not make much clerical work. See form two.

If the supply that is on hand does not last a month, a new average should be taken when this amount is used up.

Form 1 PERPETUAL INVENTORY

Article, Brooms — Article No. ..... — Max. 10 doz. — Acct. No. 109
Size, Heavy — Bin No. 10 — Min. ¼ doz. — Unit .....

ORDERS PLACED			RECEIVED—DEBIT					USED—CREDIT				BALANCE		
Date	Order No.	Quantity	Date	Order No.	Quantity	Price	Amount	Date	Quantity	Price	Amount	Quantity	Price	Amount
Dec. 1	6974	5 doz.	Dec. 4	6974	2 doz.	$6.00	$12.00	Dec. 4	5	$0.50	$2.50			
Dec. 15	6980	5 doz.	Dec. 6	6974	3 doz.	6.00	18.00	Dec. 5	1	.50	.50			
			Dec. 20	6980	5 doz.	4.00	20.00	Dec. 7	6	.50	3.00			
								Dec. 9	4	.50	2.00			
								Dec. 11	2	.50	1.00			
								Dec. 15	6	.50	3.00			
								Dec. 17	2	.50	1.00			
								Dec. 18	4	.50	2.00			
								Dec. 19	6	.50	3.00			
								Dec. 24	7	.50	3.50			
								Dec. 26	5	.50	2.50			
								Dec. 27	1	.50	.50			
								Dec. 28	6	.50	3.00			
								Dec. 29	5	.50	2.50			
								Dec. 30	2	.33⅓	.67	58	.33⅓	$19.33

Form 2 PERPETUAL INVENTORY OF BROWN BLEACHED SULPHITE

Date of Invoice	Shipper	Car No.	AMOUNT RECEIVED Date Received	No. Packages	Weight	Price	Value	AMOUNT USED Date	No. Packages	Weight Reported	Total Weights	Price	Value	AMOUNT ON HAND Date	No. Packages	Weight	Price	Value
Nov. 1	Balance				1,131,525	$3.50	$39,603.38											
Nov. 23	B.own	110277	Nov. 1		47,318	4.00	1,892.72											
			Frt.	61,206			235.64											
Oct. 26	B.own	520776	Nov. 11		59,292	4.00	2,371.68											
			Frt.	77,364			297.85											
Oct. 29	B.own	103859	Nov. 5		47,195	4.00	1,887.80											
			Frt.	85,840			330.48											
Nov. 1	B.own	63341	Nov. 18		60,770	4.00	2,430.80											
			Frt.	109,516			421.64	Nov. 30		Used	384,034	$3.50	$13,441.19					
Nov. 12	B.own	49269	Nov. 19		45,239	4.00	1,809.56	Nov. 30		Balance	1,102,453		42,480.88					
			Frt.	56,513			217.58											
Nov. 13	Brown	81732	Nov. 19		35,843	4.00	1,433.72											
			Frt.	47,461			182.72											
Nov. 25	B.own	62639	Nov. 29		59,305	4.00	2,372.20											
			Frt.	26,369			434.30											
					1,486,487		$55,922.07				1,486,487		$55,922.07					
Dec. 1	Balance				1,102,453	$3.85	$42,480.88											

Sunshine Poems

Just whistle a bit, if the day be dark,
And the sky be overcast;
If mute be the voice of piping lark,
Why, pipe your own small blast.

Just whistle a bit, if your heart be sore;
'Tis a wonderful balm for pain.
Just pipe some old melody o'er and o'er
Till it soothes like summer rain.

—Paul Laurence Dunbar.

Which is the road to Happiness?
Which is the road, you say?
Every road is a happy road
If we only know the way.

For a blithesome heart has the magic touch
Which turns into gold each day,
And finds in the glorious Here and Now
The secret of Happiness Way.

—Martha B. Thomas.

Power Plant Management

Coal and Ash Handling Equipment—Part III

By ROBERT JUNE, M. E.

This article is the third part of a series of four by Mr. June on the important subject of Coal and Ash Handling Equipment. The last part will be published in the March issue.—Editor.

IN our preceding discussions we have considered the advantage of coal and ash handling equipment from the standpoint of elimination of uncertain labor element, increase of coal storage capacity, and reduction of handling costs, and have called attention to the necessity for expert advice and detailed study in the selection of methods and equipment for any particular plant.

We have seen that the fundamental requirement of any proposed installation is that it shall satisfy the O M I H formula; that is, that the operating costs O, plus maintenance costs, M, plus interest on total money invested, I, of the system which it is planned to introduce, shall be less than the cost, H, of doing the same work by hand, or by some other system. We have indicated that it was generally preferable, though not always necessary, to divorce the coal and ash handling on account of the destructive abrasive qualities of the ash.

Taking up the various types of equipment, we have considered spiral, flight, and scraper conveyors. aprons and V-buckets, and pivoted over-lapping dump buckets, finding that the latter, although the most expensive system to install of any of the chain types, is generally regarded by power plant specialists, in both the operating and consulting fields, as the most economical for medium and large sized boiler plants.

Leaving the chain group we now come to continuous belt conveyors.

Continuous Belt Conveyors

Here we have a type of equipment possessing the distinct advantage over any previously considered, of being driven from any point in its length. The importance of this feature will depend upon individual conditions, but it should never be overlooked in planning a system for an existing plant. Further notable advantages are the simplicity of drive—a motor with connecting belt to one of the conveyor pulleys, generally sufficing, the almost unlimited capacity—the width of the belt depending only upon sufficient fiber stress in the materials of which it is composed and the flexibility of the system. Conveyors 700 or 800 feet from center to center, and capable of handling 400 to 500 tons per hour are in successful use. The angle of repose of the material is the only limiting factor to the inclinations at which belt conveyors may be operated.

In the Robins belt conveyor, which is typical of the best design and construction practice in this type, the material is discharged where needed by automatic tripping devices. The trippers consist essentially of two pulleys, one above and slightly in front of the other, the belt running over the upper and under the lower one, the course of the belt resembling the letter S. The material is discharged into chutes on the first downward turn of the belt. The trippers may be movable or fixed, single or in series. Movable trippers are used when it is desired to discharge the load evenly along the entire length, as, for instance, in a continuous row of bins, while fixed trippers are employed where the load is to be discharged at certain and somewhat separated points. The movable trippers are made in two forms, "hand-driven" and "automatic." In the former they are moved from point to point by means of a hand crank. The "automatic" tripper is propelled by the conveying belt through the medium of gearing. It reverses its direction automatically at either end of the run and travels back and forth continuously distributing its load. It can be stopped, reversed, or made stationary at will.

As the material is actually carried, it is possible to operate belt conveyors at much higher speed than are possible with drags or any other types of carrying conveyors. The capacity of belts is therefore relatively much greater than those of other types of conveyors. It is the present writer's belief—a belief concurred in by many engineers, but not, be it noted by all—that belt conveyors should never, under any circumstances be used for the handling of ashes, for the following reasons:

1. High initial cost of installation.

2. Necessity for thoroughly quenching ashes before placing on conveyor to avoid destruction of belt by heat.

3. Rapid destruction of belt, caused by abrasive nature of ash. There is an extremely good possibility of having to replace belts used for conveying ashes, every six months, thus running the cost of maintenance up beyond all reason.

The power required to operate belt conveyor, as stated by C. K. Baldwin, in the following empirical formulas:

For level conveyors: $$Hp = \frac{CTL}{1000}$$

For inclined conveyors: $Hp = \frac{CTL}{1000} + \frac{TH}{1000}$

C equals Constant as in Table I.
T equals Load in tons (2,000 lbs.) per hr.
L equals Length of conveyors between centers.
H equals Vertical lift of material.

TABLE I

Width of Belt	12	16	20	24	28	32	36
Constant C	0.234	0.220	0.205	0.195	0.175	0.163	0.157
Additional h.p. required for each tripper	0.50	0.75	1.25	1.5	2.25	2.75	3.25

TABLE II

Additional power to be added to results of formula for friction of conveyor ends and driver

Length of Conveyor	25 ft.	50 ft.	75 ft.	100 ft.	200 ft.	500 ft.
Additional power required	80%	50%	30%	20%	10%	4%

Belt conveyors may be regarded as better adapted to the requirements of large plants than to small.

Hoists

Of the various systems of hoists, such as hoist and hand car, hoist and cable car and hoist and trolley, we can, in a general discussion such as the present, dismiss the first two, since, although there are several prominent installations of both types in the United States and Canada, the total number is comparatively limited, and it is apparent that these are types not likely to survive.

Hoists and Telpherage

The telpher is a type of hoist deservedly popular for small and medium-sized as well as large plants. In many ways the installation of the hoist and trolley system appeals as one of the logical and desirable solutions of the coal and ash handling problem. It is of course used in connection with bucket or belt conveyors, as well as without. Where coal storage is desired and space adjacent to the boiler-room is available, the hoist and trolley system will generally prove

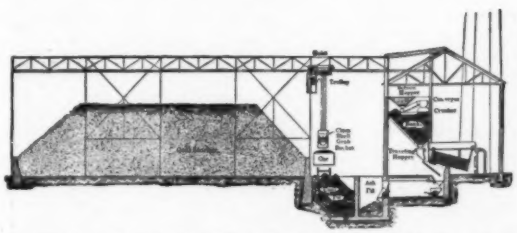


Fig. 1—Coal and Ash Handling System, Scioto Valley Traction Company

the most economical installation, and its possibilities should be thoroughly canvassed.

Figure 1, supplied through courtesy of Professor Gebhart, shows the installation of a telpherage system at the plant of the Scioto Traction Company. With this arrangement, if the coal car is of the dump type the contents are discharged directly into the coal pit from which the coal is removed by grab bucket and transferred either to the overhead bunker or to the storage pile. If the coal car is of the gondola type the coal is removed directly from the car by the grab bucket. The bucket is hoisted and carried on the trolley into the building over the screen hoppers where it discharges it contents; the finer particles fall directly into the bunker and the larger lumps are automatically delivered to the crusher. The grab bucket will take about 98 per cent. of the coal in the car, leaving only 2 per cent. to be handled by hand. Coal is fed to the stokers by means of a

Fig. 2—Grab Bucket Hoist, Power House, City of Holyoke, Gas and Electrical Department, Holyoke, Mass.

traveling electric hopper which receives its supply from the overhead bunkers. The present capacity of the plant is 50 tons per hour taken from the car or pit to stock pile.

Where it is possible to use the telpher without employing some additional type of conveyor, notable economies in costs of handling can be effected. It would be hard to imagine a more effective or economical system for unloading coal from cars, storing it, and supplying it to a battery of eight boilers, than that illustrated in Figure 2. An excellent feature of this system is that where an old boiler-room is concerned, it can frequently be installed with fewer changes, and at much less expense than would be possible with belt or bucket conveyors.

The hoist and trolley is one of the best forms of ash handling equipment for use where ashes are produced in large quantities and are to be carried to a considerable distance from the plant. It is also an exceptionally good method for taking care of large, hard clinkers, which cannot be broken small enough to be handled in other types of conveyors. For this reason it is particularly adapted to use with gas producers or other furnaces in which large clinkers and wet ashes are produced. In installing this class of equipment, the tracks should be so arranged that the bucket can be dropped directly into the ash pit or directly in front of the ash door in hand-fired plants. The buckets should also be of sufficient capacity to remove the entire accumulation of ashes in one pit at one loading.

Locomotive Cranes

For small and medium sized plants, where normal coal storage is desired, the locomotive crane is entitled to consideration. Fig. 3 shows a simple, effective layout for boiler-room, with coal track and storage immediately adjacent. As between the locomotive crane and the hoist and trolley systems, local conditions and comparative costs of installation and operation, as worked out for the particular plant under consideration, will govern the choice.

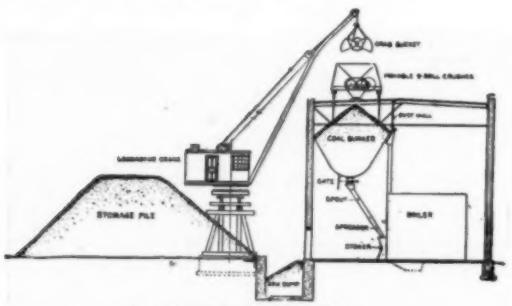


Fig. 3—Locomotive Crane

Skip Hoists

As skip hoists are primarily ash conveyors, we are brought in discussing them, to a consideration of the desirability of divorcing the coal and ash handling systems. As a general proposition, this separation of the systems is emphatically desirable. Coal is, by nature, graphitic and causes little wear to the conveyor. Ashes, however, are abrasive, and may in addition be red hot or dripping wet. The abrasive quality produces excessive wear on chain conveyors. Red-hot ashes are practically certain to produce distortion and to some extent disintegration of the equipment.

A chain conveyor system which will handle both coal and ashes is expensive to install, expensive to operate, and expensive to repair. The ashes get in the chain joints and therefore the system is subject to the abrasive action of the ashes even when handling coal. When handling ashes the entire apparatus must make a complete circuit in order to convey the ashes a short distance. Frictional losses are comparatively large for the work accomplished. Furthermore, in the usual installation no ashes can be removed when coal is being handled, or vice versa, and it is extremely likely that occasions will arise with considerable frequency when the equipment is urgently needed for both services at the same time.

If separation of the systems is a logical procedure. the skip hoist is likewise a logical equipment for ash removal. The apparatus consists (see Fig. 4) of a bucket running on inclined or vertical tracks and hoisted by means of a steel cable attached to a winding machine. The bucket consists merely of a rectangular steel box open at the top and fitted with guide rollers and hoist bale.

The winding machine is usually driven by an electric motor.

The bucket is started by a pull on the starting rope or pushing a button. It discharges and returns automatically to the pit, where it stops. In some cases the skip reciprocates continually and is automatically filled.

The Skip Hoist is the best and most commonly used ash-hoisting device. In connection with a small push or electric car to collect ashes from hoppers under the boilers, it possesses the following advantages:

1. Durability: Ashes can be handled either wet or dry; hot or cold. The skip bucket is not materially affected by any of these conditions, as are chain joints, elbows, exhausters, etc., constituting other types of ash-handling equipment. The hoist itself, being the only part that can be injured by the ashes, is always placed in a position remote from the skip so that dust or dirt cannot reach it.

2. Adequate Capacity: A 35-cubic-foot trolley ash hopper car on 130-foot haul, traveling 400 feet per minute, can make a round trip (260 feet) in two minutes, including filling and dumping, assuming that ashes will flow by gravity into car. This equals 20 tons per hour for the extreme haul, or 40 tons per hour for average haul. A skip, consisting of two buckets, one going up while the other is coming down,

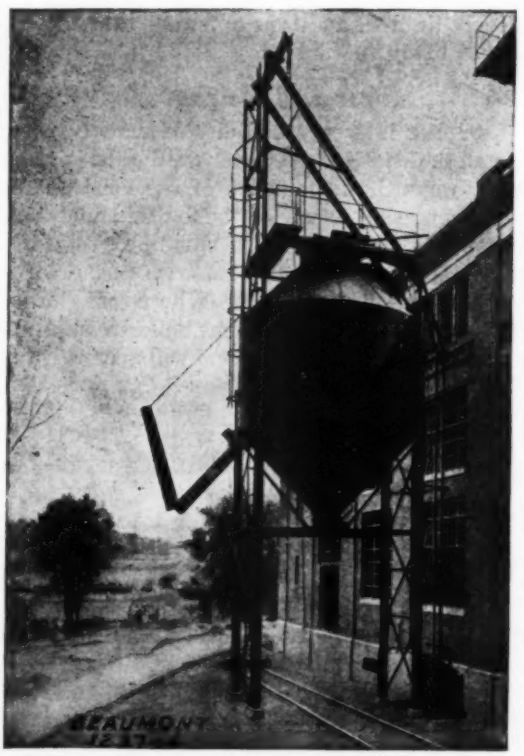


Fig. 4—Skip Hoist and Bunker, Philadelphia Suburban Gas and Electric Company, Phoenixville, Pa.

can make a trip in 90 seconds, including filling and dumping. If buckets are 35-cubic-feet capacity each, the capacity would be 28 tons per hour at 50 cubic

feet per ton and 50-foot lift. Plants producing large quantities of ashes are thus easily served.

3. The car and skip method is about the only successful method for handling extremely large and hard clinkers. The clinkers handled by this system need little breaking.

4. Power is used only when ashes are being actually hoisted and is not wasted while ashes are being brought to the hoist.

5. The skip hoist can easily be designed and constructed so that it can be loaded or dumped at different levels. In this way it is possible to handle ashes from boilers on different levels in the same hoist, and also to discharge at different elevations.

The disadvantages of the skip hoist are comparatively high initial cost, so that the economcial value of the installation is questionable where there is less, say, than 3,000 h. p. of boilers to serve. A further disadvantage is that the ashes must be moved from the boilers to the hoist by manual labor. The car and skip hoist system should never be considered for installation in a plant that is not provided with ash pits from which the ashes can be dumped directly into the cars; otherwise too much labor is required for loading the cars.

Convention of the Canadian Pulp and Paper Association

Held on January 19, 20 and 21, 1921, at the Ritz-Carlton Hotel, Montreal

THE eighth annual convention of the Canadian Pulp and Paper Association was held in Montreal on Friday, January 21, and was attended by what is said to have been the largest and most representative gathering of any in its history, including many members of the American Paper and Pulp Association. Meetings of the various sections of the association were held during the three-day period, beginning on Wednesday, the 19th. The Canadian Forestry Association, whose interests are allied with those of the Pulp and Paper Association and the Newsprint Service Bureau, composed of the principal newsprint manufacturers of Canada and the United States, held their meetings also.

The business of the convention was called to order at 10 o'clock on Friday morning by President George Chahoon, jr., who addressed the meeting as follows:

The President's Address

In looking back over the year just closed, there are a number of outstanding things in connection with the work of the association that are entitled to your consideration.

First and foremost, I think we should place the initial steps which have been taken towards establishing a Department of Scientific and Technical Research in connection with the industry. The preliminary details have been carefully mapped out, and the scheme as a whole has, I am pleased to say, met with practically universal approval from the members to whom it has been submitted. The secretary will place the subject before you in detail, together with a statement of the responses received, and it will be for you to say whether this work shall proceed and to what extent. The Executive Council have already given it their hearty approval.

In this connection, it is gratifying to be able to report that some progress has been made during the year by the committee having in charge the preparation of a series of educational text-books, for which funds were voted at the two preceding general meetings. This committee will make a report of their work at this meeting.

The council, at the instance of the Technical Section and the Committee on Mechanical Standards, voted $1,000 to be applied to an investigation into copper alloys and bearing metals.

Newsprint Control Abolished

An important event for the newsprint section of the association was the termination, in July last, of Government control of the price and distribution of newsprint in Canada, which had been in effect for over two and a half years. This action, as you are all aware, was preceded by an appeal to the courts by Price Bros. & Co., Ltd., against an arbitrary order issued by the Board of Commerce, the result of which was definitely to establish that the industry had for a long period suffered impositions and restrictions which could not be justified under an impartial application of the constitutional law of the country. The association and the industry are under obligations to Price Bros. & Co. and to Sir William Price in particular for their courageous action in bringing the question to an issue.

Prior to the final lifting of control, a determined effort was made, in June last, by certain of the newspaper publishers to secure new legislation intended to reinstitute control in some other form. The Government, in fact, introduced a bill in Parliament for that purpose, but withdrew it after prolonged hearings, in which both interests were represented.

It should also be stated that amicable relations have been restored between the publishers and the newsprint manufacturers, and that some of the more representative publishers have made public record of their convictions, as a result of the experience of the past three years, that Government control of the newsprint industry worked out to the economic disadvantage of those whom it was designed to serve, and that the newspaper industry of Canada would be in a stronger position today had the laws of trade been permitted to take their natural course without interference.

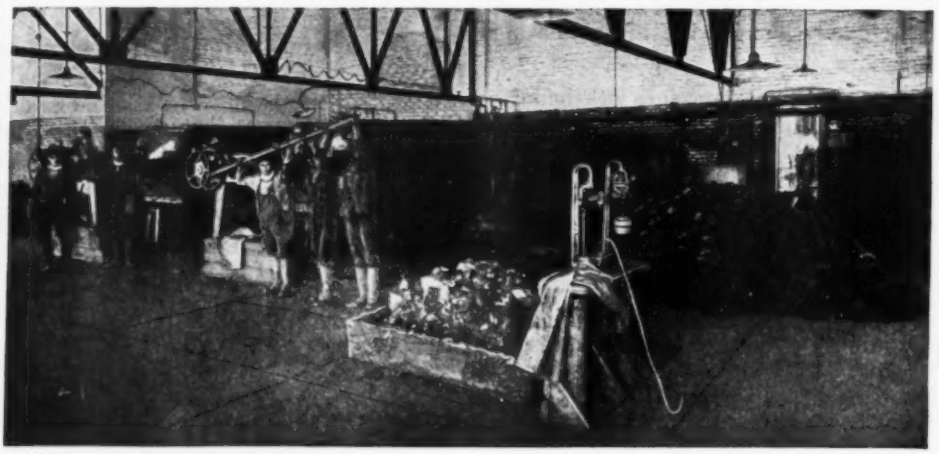
Forestry Legislation

The question of the conservation, proper administration and perpetuation of our pulpwood supplies continues to be one of the most vital affecting our industry. The provincial governments of Quebec and Ontario have recently revised the regulations under which their crown lands are administered, not only with a view to enlarging their revenue therefrom, but also with that of ensuring a continuity of supply of pulpwood. The association executive, and particularly the woodlands section, under the able guidance of Gen. J. B. White, have co-operated in these efforts. The woodlands section held a most successful meeting in Toronto during the fall, the first to be held outside the Province of Quebec.

At the imperial forestry conference, held in London last summer, the association was officially represented by Mr. Ellwood Wilson, while several of its members were also present in other capacities. The conference developed a very considerable interest in Canadian forestry matters, and it is understood that its next meeting will be held in the Dominion.

The passage by the Congress of the United States of the legislation known as the Underwood Resolution, seeking to open the way to the free exportation from Canada of pulpwood cut from crown lands, naturally provoked much interest among our members, who feared that this measure, if it were successful, would prove detrimental not only to their industry, but to the country at large, and therefore regarded its disapproval by the President with satisfaction.

The Executive Council feel that there is great need of educational work among the people of our several provinces in connection with the securing of proper, effective and adequate legislation for the protection of our forests and the perpetuation of our wood supplies. In proposing such legislation, we have also realized that we have certain obligations of our own to perform, one of which is to assist in building up, as far as possible, a public sentiment that will support the several provincial governments in enacting this legislation



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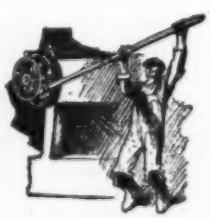

and in giving it due effect. As one means to this end, the Executive Council proposes the coming year to send a representative of the association to Northern Europe to gather what information we can regarding forestry conditions there and to supply the information so obtained to the newspapers and periodicals of Canada, and thereby to assist in convincing the people of the Dominion that it is to their interest, no less than our own, that progressive forestry legislation should be enacted, and that the proposed regulations should be made effective.

The Tariff Commission

Through the Executive Council, a special committee was appointed to appear before the Cabinet Committee on Tariff on behalf of the pulp and paper industry. Mr. S. J. B. Rolland and Mr. F. J. Campbell appeared before the commission and presented an argument which, we have every reason to believe, met with the commission's approval.

Foreign Visitors

The association was honored during the year by having as its guests several gentlemen associated with the pulp and paper industry in Europe. Among them were Baron Mannerheim and Mr. Storjohann, of Stockholm, Sweden; Mr. Walter Graesbeck, managing director of the Finnish Cellulose Association, and Mr. Hj. Gronvik, managing director of the Finnish Paper Mill Union, of Helsingfors, and Mr. Carl Wahren and Mr. Alfred Byvall, of Finland. The conferences which ensued were, on our part, aimed at impressing the representatives of these different countries with the benefits to be derived from the exchange of statistical information bearing on conditions prevailing in the industries of their countries and our own. These gentlemen returned to their homes apparently appreciating greatly the evidences of confidence and co-operation existing between the members of the industry in Canada and the United States, and with the intention of so organizing their own industries as to be in a position shortly to offer us, through the exchange of statistical information, all of the benefits that could be derived from a world-wide association.

Several of our own members also made trips abroad during the year. Mr. J. A. Bothwell and Mr. T. J. Stevenson, as the association's representatives, and Mr. G. F. Steele visited the Scandinavian pulp and paper industries and received a cordial welcome and were offered an insight into conditions as they exist in those countries. Mr. H. Biermans and Mr. C. Howard Smith also made trips abroad during the year and brought back information of much benefit to the industry generally.

Our relations with our sister organizations in the United States have continued of the utmost cordiality, and there have been numerous interchanges of personal visits and of formal and informal greetings from both sides of the line.

The Imperial Press Conference

The association was honored during the year by an invitation to appear before the meeting of the Imperial Press Conference, held in Ottawa. The publishers therein represented displayed a lively interest in Canada as a source of paper supply for the British Empire. Many of the visitors also took advantage of the oportunity afforded them of paying visits of inspection to a number of the mills.

Our Transportation Department

The Transportation Department, under the direction of Mr. G. P. Ruickbie, continues to do much good and useful work, both in securing the adjustment of claims and in representing the association before the Board of Railway Commissioners and other bodies. Not all the members make as full use of this department as they should, but those who do so are well satisfied as to its benefits. Those who are not fully acquainted with the department's usefulness and its work should study carefully the report in detail to be submitted at this meeting with a view to determining whether or not its services could not be used by them to their advantage.

The Association's Handbook

For the first time in its existence, an attempt was made during the year to collate and publish, in easily available form, information and data respecting the history, progress and ramifications of the industry, which resulted in the publication of the "Handbook of the Canadian Pulp and Paper Industry," with which you are all familiar. Several thousand copies of the book have been printed and distributed, and the work has met with very general favor. Demands for the book have come in from practically every quarter of the globe where paper is used, and the result cannot but be beneficial to our members. It is the intention to revise this book from time to time so as to keep it as an up-to-date compendium of information in respect to the pulp and paper industry of the Dominion.

In Conclusion

In conclusion, the members will be gratified to learn that the affairs of the association generally are in a healthful state, as the report of the secretary-treasurer to be presented will indicate. There have been several additions to the membership, and much activity all along the line. The various sections, as their reports to be placed before you will show, have all been usefully employed, and are planning progressively for the future. It has been found necessary to amend By Law No. 10, governing the revenues of the association, in some particulars in order to keep pace with the increasing activities of the organization, notice of which has been sent to all the members, and confirming action is asked of this meeting.

Personally, if I may be permitted a word, I would express my appreciation and gratitude for the loyal co-operation of the membership, as well as for the faithful services of all those engaged in carrying on the association's work I bespeak, also, your hearty support of the incoming administration, as I believe that during this year, perhaps more than ever before, close co-operation and mutual assistance will be found essential to the progress of the organization and to the welfare of its individual members.

The main business of the meeting, apart from the formal adoption of reports of various sections, was the consideration of a department of technical research, to combine the general research work of the various industries members of the association, this department later to be incorporated in the proposed Central Bureau of Technical and Scientific Research, under Government auspices at Ottawa. For the establishment of this bureau legislative sanction will be sought at the approaching session of Parliament at Ottawa.

A report favoring such action was presented by Mr. H. L. Jones, chairman of the Special Committee on Research, as follows:

History of Movement Prior to Appointment of Above Committee

It has been realized pretty generally within the association, and particularly by the technical section, for over the past two years that the pulp and paper section of the Forest Products Laboratory was not functioning in a manner so as to produce the maximum benefit to the industry and the public at large. One of the chief weaknesses has been lack of staff.

Realizing this, the technical section had appointed a standing committee called the "Committee on Forest Products Laboratory." This committee had studied the situation thoroughly, and in various reports had pointed out the situation, namely, a finely appointed laboratory for pulp and paper research with thousands of dollars worth of equipment, but lacking any proper program of work, staff or proper guidance.

In 1919 the Canadian Pulp and Paper Association authorized a substantial contribution towards the superintendence of the laboratory, but such contribution was not found acceptable to the Government.

Various schemes have been proposed by individuals, all of which have been discussed by the executive council of the technical section from time to time, ranging from co-operation with the Government in the running of the laboratory to the buying of the equipment and starting of a laboratory in various new locations.

No co-ordinated effort looking to the final solution had occurred up to the time of the 1920 annual meeting of the association, and so at the first meeting of the Executive Council of the main association, held in 1920, the president of the association, Mr. George Chahoon, jr., instructed the technical section to make a thorough investigation of the subject and to report with recommendations at the annual meeting of the association in 1921.

During the spring months of 1920 the technical section chairman gathered the opinions of a large number of members who were conversant with the situation as well as the general opinion of many more relative to the advisability in a general way of the association attempting to go into such a field. Furthermore, this subject was thoroughly advertised to all members as being one of the chief points for discussion for the 1920 summer meeting of the technical section.

The result of this discussion was that it was thought wisest to have the investigating committee consist of representatives of the manufacturers or management as well as of the technical staffs. Consequently, the joint committee of six, three technical men and three from the managerial end, was appointed.

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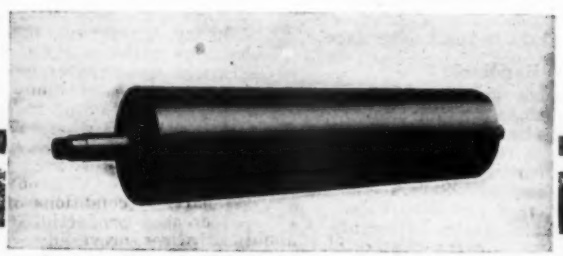

Work of Committee

Review of Forest Products Laboratory—The committee had prepared, through the secretary of your association, a complete review of the accomplishments to date of the pulp and paper section of the Forest Products Laboratory, showing their original program, how much was carried out, etc., and the present state of this section of the laboratory.

Meeting of Committee—The committee met on November 20, 1920, in Montreal, all members being present, and the matter was thoroughly gone into in all its phases.

The decision of the committee is as has been outlined in the recent circular letter of the secretary of the association. Briefly it is as follows:

Your committee recommends that the association engage in the establishment and maintenance of a department devoted to technical research on pulp and paper work.

The committee feels that at the beginning no attempt should be made to take over nor work through the Forest Products Laboratory and no attempt to build a laboratory of our own until further developments have taken place.

The committee recommends that the association co-operate to the fullest degree with the Canadian Council of Industrial Research in the furthering of the project of the proposed National Research Institute.

That to fully carry out this work, the association should have the services of a director of research, with competent staff, who will be in full charge of all this work until such time as actual research work is begun, and who will then be the director of this branch of the association work. The details of the preliminary work of such a director and staff have already been set forth in the recent report by the secretary of the association sent to all members of the association.

The committee recommends that the necessary expenses, which are estimated at around $35,000 for the first year, be furnished by the members of the main association on a pro rata basis.

The Need for Such a Department

I do not believe it is the duty of this committee to go thoroughly in this report into the details of the desirability of such a department. I will refer you to the annual report of the retiring chairman, of the technical section, Mr. L. H. Shipman, who has set forth there the details of one problem alone which should be sufficiently illustrative of the general need of such a department of our association.

Problems similar to the one there outlined exist without number throughout all branches of our industry. Particularly are we working in the dark in our beating operations. What we think are identical conditions of material and operation give us entirely different results on different days. Only efficient, well-directed and non-interrupted research will furnish us the why and wherefore and allow us more uniform results.

Finally a Word of Warning

While your committee is unanimous in their recommendation, it is made with the full understanding that the successful carrying through of such a program entails other support by the industry than that of money. This alone will not suffice. To quote a gentleman who has had considerable experience in co-operative research:

"It is one thing to talk co-operation and a laboratory program to be carried out for the benefit of all, and quite another to generously support such a program by helpful contributions other than money. Instances have been known in other industries where such a co-operative research organization has been well supplied with funds and a lot of pro bono publico talking done, but when it came to the contribution of facilities or information, most of the mills were found to be tight shut."

Your committee feels this to be a point which should have careful consideration by the association. Certainly we should not embark upon the proposed plan unless all plants and companies are prepared in advance to give the heartiest and best co-operation. And your committee would like to have this point thoroughly discussed in all its phases before the association makes its decision, so that if the plan goes through, all members may be fully aware of just what is contemplated.

A long discussion ensued as to the course to be followed by this, which included a discussion as to the proper sequence of text-books for technical instruction, and the relative value of mathematics and physics.

Report Adopted

The report for the establishment of the department of technical research was unanimously adopted, with provision for the necessary financial support, and it was decided to make an additional grant to the work of the international committee which is compiling a series of educational text-books for the use of those engaged in the pulp and paper industry, which has several books so far advanced as to probably be ready before the end of the year.

The Newsprint Section Report

The report of the newsprint section was presented by Chairman George McKee, as follows:

The records of the year just closed, relating to the newsprint industry, show that price and demand continued upward from the beginning of the year until the very end.

The cry for supplies of newsprint from almost every country in the world taxed the producing capacity of that continent as far as it could be engaged. This insatiable demand forced prices upward and created an enormous "spot" demand for newsprint paper. A large number of paper-making machines that usually made other grades of paper were attracted to producing newspaper, and this, together with the installation of some new machines and the high production records of the regular newsprint mills, resulted in the largest tonnage ever produced by the United States and Canadian mills. This approximated 2,400,000 tons, or a gain of nearly 11 per cent over 1919 production.

According to the figures available, production for the sixteen Canadian companies reporting to this section was about 883,000 tons, a gain in production of 113,198 tons, or nearly 15 per cent. A portion of this increased tonnage was due to the starting of new machines in some of the existing plants, but not entirely, as all of the mills operated throughout the year at a higher production efficiency than ever before. This high operating efficiency is brought about by friendly rivalry among the mills, and the free exchange of operating data, all of which tends to place our industry on a very high plane.

In reviewing the past year with its continued increased demand for our product, the opening of the new year presents new problems as regards the future outlook in reference to the phases through which general business is now passing. It is quite possible that the prices of newsprint paper may show some reduction, especially in the so-called "spot" market, during the coming months. The Canadian manufacturers have had no interest whatever in this market, as practically the entire tonnage has been sold on a contract basis, at reasonable prices. In fact, some of the contract prices were extremely low, taking into account general market conditions. None of the manufacturers were attracted by the frequent "spot" offers, but adhered strictly to their contract obligations. With this record behind them, the Canadian manufacturers of newsprint have little interest in the much-talked-about world-wide readjustment in commodity prices; their prices have not been high, and, therefore, have little to fall.

It is gratifying to report that the manufacturers were able to handle the requirements of the Canadian consumers throughout the year, without Governmental interference. The Canadian market having been placed on a competitive basis, all the publishers were fully supplied with paper, and amicable relations now exist between producer and consumer. All of the former antagonistic attitude having disappeared, the publisher now shows every desire to meet the manufacturer on a straight-forward business footing.

With regard to the future outlook, it is impossible to estimate how long readjustment will take. The underlying conditions of the Canadian newsprint industry are sound, and it is only reasonable to expect that, with the prestige of Canadian newsprint in the world's markets, we will readily adjust ourselves to the new conditions, and that the industry will enter upon a new era of expansion and prosperity, exceeding any that it has heretofore enjoyed.

Report of Mechanical Pulp Section

J. A. Bothwell, chairman of the Committee on Mechanical Pulp, presented the following report:

The year 1920 was one of extreme activity for the members of the mechanical pulp section. In the early part of the year, the abnormal demand for newsprint paper and the high price level reached, the spot market was reflected in an increased demand and higher prices for groundwood pulp, and the mills were kept working at high pressure. With the easing off of the spot news market, there was, during the latter part of the year, a falling off in both the demand, and the market price of groundwood pulp counteracted, however, in part, by conditions of drought at some of the mills which decreased production to an appreciable extent. The abnormal prices prevailing throughout a large part of the year were absorbed to some considerable extent by higher production costs.

The export demand was well maintained during the year, as is indicated in the accompanying table, showing exports

POWER AND EQUIPMENT

POWER

48—823-H.P. Sterling Boilers, type M-30, 200 lbs. pressure with Westinghouse 8 retort stokers.

5—500-H.P. Keeler water tube boilers 160 lbs. pressure with Wetzel stokers.

40—18x36, 350-H.P. Allis-Chalmers Corliss Engines, heavy duty, double eccentric.

1—3500 K.W. General Electric Condensing Turbine, three phase, 60 cycle, 2300 volts.

2—300 K.W General Electric Condensing Turbines, three phase, 60 cycle, 2300 volts.

2—1000 K.W. Allis-Chalmers Non-Condensing Turbines, three phase, 60 cycle, 2300 volts.

800—Motors, all 3 phase, 60 cycle, 220, 440 and 2300 volts, standard makes, from one-quarter to 300 H.P.

3—No. 5 Allis-Chalmers Vertical High Vacuum Jet Condensers.

1—Westinghouse-LeBlanc Condenser (for 3500 K.W. Turbo).

6—15-26x30x24 Compound Duplex L. D. G. Compressors, feather valve, 60 lbs.

2—9-17x15-9x12 Compound L. D. G. Compressors, 110 lbs.

SUPPLIES

Acid Pumps
Machine Tools
175 miles Pipe, all sizes
Corrugated Iron
2000 Wood Tanks
Steel Tanks
Belting
Shafting and Pulleys
Ice Plants
Acid Recovery Plants
Machine Tools
Mill Supplies
Plumbing Materials
Heating Equipment
Chemical Equipment
Steel Buildings
Building Material
Restaurant Equipment
Acid Making Plants
Causticizing Plant

PUMPS

10—14-inch Worthington 8600 gpm, 152' head Centrifugal Pumps, dc to 300 H.P. General Electric Motors.

2—10-inch Worthington Type S Centrifugal Pumps, dc to 150 H.P. Westinghouse, 3 phase, 60 cycle, 2300 volt Motors, 3750 gpm, at 130' head.

4—14-inch Worthington Type S, 7500 gpm, 130' head, 300 H.P. General Electric Motors, 2300 volts.

6—14-inch Allis-Chalmers Type S, 6500 gpm, 150' or 8100 at 90' dc to Steam Turbine.

3—8-inch A.W.W., 1000 gpm, Centrifugal, dc to 100 H.P. Westinghouse, 2300 volt Motors, 1000 gpm, 125 lbs.

6—14-20x7½x18 Worthington Compound Duplex O.P. Pumps, 400 gpm, 300 lbs. pressure.

10—25-38x4-5½x24 Worthington Tandem Compound Duplex Pumps, 150 gpm, 3600 lbs. pressure.

3—20x12x16 Duplex Underwriters Fire Pumps, 1500 gpm, 100 lbs. pressure.

75—Diaphragm Pumps, all sizes, gasoline, electric, and hand operated.

Write or wire for specifications and prices on the above new and practically new equipment of the government's $87,000,000 OLD HICKORY project

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BOILERS

Surplus stock taken over from the Du Pont Chemical Co. and other plants.

PRACTICALLY NEW
Used Six Months to Three Years
Offered Subject to Any Inspection

No.	Size, Hp.	Make	Pressure, Lb.
9	600	Edge Moor (Ohio Standard)	200
13	600	Edge Moor	200
20	600	Edge Moor	160
1	813	Edge Moor (A. S. M. E.)	200
Above located in du Pont Chemical Company's Plant at Hopewell, Virginia			
2	295	B. & W. (Stirling) located Carney's Point, N. J.	200
5	253	Stirling Class E No. 22	160
2	264	B. & W.	160
10	512	Stirling Class S No. 26	160
2	512	Stirling Class S No. 26	160
1	823	Stirling M-30 (A. S. M. E.)	200
2	550	Edge Moor	150
2	238	Edge Moor	150
1	231	Edge Moor (Ohio Standard)	150
1	199	Edge Moor	150
1	100	Smith HRT	100
1	50	Ames Locomotive	100
Above boilers located at du Pont Chemical Company's Plant, Carney's Point, N. J.			

MISCELLANEOUS

No.	Size, Hp.	Make	Pressure, Lb.
1	400	Stirling	150
2	400	Wickes	150
2	250	Wickes	165
2	250	Wickes	150
1	300	Wickes	150
1	225	Geary	150
1	250	B. & W.	125
2	210	B. & W.	125
1	125	Scotch Marine	125
1	78 x 20	H.R.T.	135
8	72 x 18	H.R.T.	125
2	84 x 18	H.R.T.	100
2	66 x 16	H.R.T.	125
2	66 x 16	H.R.T.	80
1	500	B. & W. Steel header	180

STEEL STACKS

3—39 in. x 75 ft. 1—60 in. x 92 ft. 6—36 in. x 60 ft.
1—14 x 36 R. H. Corliss Engine.

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Write or Wire Sales Dept. for specifications and quotations also when you have boilers for sale.

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month by month in comparison with those of the preceding year:

Exports of Mechanical Pulp by Months, 1919-1920

	1919		1920	
	Cwts.		Cwts.	
January	274,384	$ 262,322	609,200	$ 972,574
February	164,673	217,421	266,826	472,383
March	169,451	226,554	289,092	562,308
April	161,449	217,711	198,664	506,369
May	255,622	356,905	279,439	779,710
June	583,151	619,981	892,309	2,136,767
July	346,174	436,604	838,118	2,528,993
August	387,435	475,735	816,081	2,809,266
September	415,046	511,402	424,689	1,877,053
October	2,038,193	1,942,716	536,329	1,986,807
November	894,206	997,408	263,976	1,016,184
December	541,240	817,692	*.....	.....
Totals	6,231,024	$7,082,451	5,414,729	$15,648,424

*Figures not available.

The heavy exportation of groundwood in October, 1919, as compared with October, 1920, is accounted for by the fact that in the former month heavy accumulations of Canadian stocks found an outlet in England and that no such accumulations have since been made in this country.

The bulk of last year's exports of this grade of pulp, as in former years, were sent to the United States, although a considerable proportion of them was sent to the United Kingdom. The outlook is for an increased development of the United Kingdom trade.

The unusual prosperity enjoyed by this branch of the industry during the middle part of 1920 led to the formation of many new enterprises for the purpose of manufacturing mechanical pulp, some of which will undoubtedly be brought to the producing stage. Not all of the proposed developments can be said to be based on sound economic lines, and it is altogether likely that many of them will never get beyond the promotion stage.

The year closed with this branch of the industry in a healthful condition and with prospects reasonably good for the future.

The section are indebted to the association executive officers for much helpful assistance throughout the year and for their assistance in promoting a spirit of co-operation among the members which has proved of great service.

Report of Book and Writing Section

The report of the Book and Writing Section was presented by Chairman H. F. E. Kent, as follows:

The Book and Writing Section are pleased to report that business has been very satisfactory for the past year; the demand for their product for the first ten months was unprecedented, and it was impossible to satisfy the buyers. During the last two months the demand eased off, and the mills have been able to ship much more promptly.

The section held eight meetings during the year, at nearly all of which there was a full representation of its members. The spirit of co-operation shown is most encouraging and is helping to get this section in a position to meet all competition and do its part in making Canada the greatest paper-making country in the world.

Raw materials were very scarce, and the qualities were much below normal, making it difficult for the mills to maintain uniformity in grades. Coal was very hard to procure, prices extremely high and the quality poor. Wages during the year increased 50 per cent, all of which necessitated very much higher selling prices than previously.

The mills, in order to meet the unusual demand made by the home market for book and writing paper, had to curtail their export business during the year, although, owing to the world-wide shortage of this commodity, they could have secured better prices from outside. They felt it, however, a national duty to keep their own market supplied first.

The section had several meetings with the Canadian Paper Trade Association during the year to discuss conditions and to try to get business on a more uniform basis. These meetings were fully attended, and the results will prove to be very beneficial to both the manufacturers and the Merchants' Association.

While business during the past year has been very satisfactory, the indications are that the first month or two of this year will be rather quiet. There will be, in our opinion, before the first quarter has passed, a decided improvement, and it will be found that this year will work out as satisfactory as the past year.

Report of the Board Section

Chairman J. F. Taylor presented the following report of the Board Section:

The past twelve months has been a year of extremes, commencing with exceptional strength and a strong demand continuously in evidence until the last three months.

The demand for the first half of the year was far greater than the supply, and the situation even as late as August was so urgent as to influence the box manufacturers to ask that export shipments be diverted for home consumption.

The manufacture of boards in 1919 in the United States, according to the Federal Trade Commission reports, showed it to be 1,950,037 tons. The production in Canada of all classes of board for the same period amounted to 137,678, or, roughly, 7 per cent of the United States total.

In the early part of the year, therefore, on account of the tremendous demand in the United States market, prices for all classes of boards rose in a very generous manner. Towards the fall, however, a slackening of business in the United States caused an important drop in the consumption of board.

In fact, in all lines there was a cessation in buying resulting in the closing down of a great many of the board mills and the usual attempts to capture the limited Canadian market by forced selling methods.

Market conditions have now brought prices to a much lower basis than heretofore, and there is every evidence of a resumption of trade within a month or 60 days which, while not promising to be on the scale of the previous year, will provide business for mills both in the United States and Canada in sufficient volume to keep them properly employed.

The Board Section has held regular meetings, some ten gatherings taking place during the 12 months during which time the opportunity has been taken to meet the box makers of Canada in an endeavor to facilitate manufacturing and trading conditions, and such conferences as were held indicated that the best possible spirit exists between the board mills and their customers.

There is undoubtedly some work to be done between the box makers and the board mills in regard to standardization of sizes, and it has also been urged during the year on behalf of the manufacturers that a great deal of the fluctuations in the market could be avoided by the institution of quantity contracts.

As regards future development of the board business, it may be mentioned that several mills are overhauling and installing new equipment that will undoubtedly increase production during the present year. Whether such plants as those manufacturing wallboard and container boards will benefit to the fullest extent from a revival of trade remains to be seen.

Coated Paper Section Report

George W. Pauline, chairman of the Coated Paper Section, presented the following report:

The coated paper mills were all fully employed throughout 1920, but were severely handicapped in supplying the demand, owing to shortage of paper stock.

Prices advanced during the year until August 1, from which date they remained stationary until the end of the year.

New business has eased off to some extent, and consequently the mills are gradually catching up on back orders.

There is an optimistic feeling regarding prospects for the current year, which we trust will be fully realized.

Report of the Felt Section

The report of the Felt Section was presented by Chairman W. R. McNeill, as follows:

The year 1920 has been a very eventful year for the felt paper mills, comprising the Felt Section of the Canadian Pulp and Paper Association.

As on other lines of paper, the demand for felt paper during most of the year exceeded the supply, and, to meet this increased demand, several of the mills have added new equipment and are now ready to turn out a materially larger daily tonnage.

The future of the felt paper business in Canada looks very bright because at least 90 per cent of the production of felt paper is converted into materials used for building purposes, and the demand for new buildings all over the Dominion will not be fully met for some time.

Our association meetings have been held regularly each month, and, with very few exceptions, have been attended by 100 per cent of its members, which indicates the interest being taken in our association.

To Mr. A. L. Dawe we again express our gratitude for his unceasing efforts in helping along the success of our section in so many different ways.

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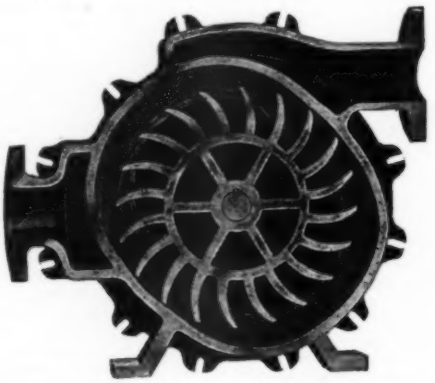

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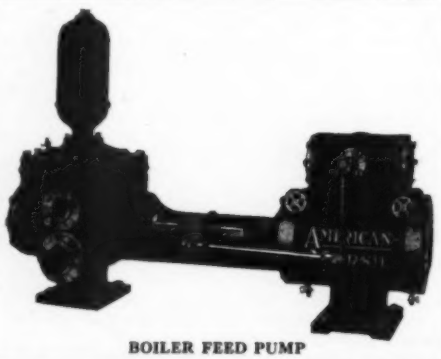
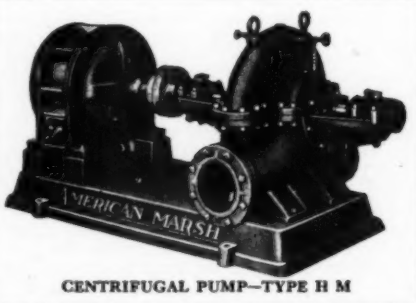


BOILER FEED PUMP



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Report of the Wrapping Paper Section

F. J. Campbell, chairman of the Wrapping Paper Section, presented the following report:

During the whole of 1920 the wrapping mills were producing to capacity, and found an active demand for their output. For the first six months of the year costs, and with them prices, kept steadily advancing; the maximum being reached by the end of June. For the remainder of the year there was an active market at steady prices, and it was not until December that any slackening off was apparent.

The advance in freight rates during the year was a very serious matter on such a heavy commodity as wrapping paper, and it is to be hoped that with the start already made, freight rates will soon reach a more reasonable level, and that the Government railways may facilitate this by a reasonable gain in efficiency.

Wrapping papers like all other commodities are now facing deflation, and if this is met with courage and common sense, no one should fear the ultimate result. By lowering prices gradually, buyers and others carrying stocks will be saved from serious loss, while the mills should be able to keep running with a fair return.

All the mills are in a strong position, and by exercising reasonable care it would appear as if satisfactory results could be looked for during the year 1921.

Meetings of the section were held throughout the year, and it is satisfactory to report that trade customs and terms are now firmly established in the wrapping paper trade.

Report of Technical Section

L. H. Shipman, chairman of the Technical Section, presented the following report:

I take great pleasure in rendering herewith a statement of the progress of the Canadian Technical Section during the year 1920. It is indeed a pleasure as retiring chairman to be able to state that the momentum acquired in past years through the excellent leadership of our officers of those years has not depreciated, and that there is no apparent tendency as yet of this section to get into a rut. We have truly progressed during the year, and all signs indicate our section to be in a very healthy state of growth and of general usefulness to the parent association, to the industry as a whole and to our individual members.

General Meetings

There have been held two general meetings, the annual meeting in Montreal last January and the summer meeting in Western territory, as the guests of the Spanish River Company and International Nickel Company. These were both successfully carried out and helped to increase the general acquaintanceship of members with each other, all of which is a factor in the fostering of that spirit of friendly co-operation between members, which is so vital to the successful functioning of our section.

We had some very timely discussions at the January meeting, particularly on the question of wide and slow versus narrow and fast newsprint machines, the discussions being led by Mr. R. A. McInnes, of Abitibi, and Mr. John Ball, of Price Bros., and this discussion has led to others between members later on during the year.

Besides this main discussion, we had a very interesting paper by Mr. F. J. Hoxie on the "Protection of Wood Piles," which brought out a very good discussion.

The Summer meeting consisted of a visit to the plants of the Spanish River Pulp & Paper Mills and the International Nickel Co. This meeting, like our usual Summer meetings, was given over more to mill visiting and the personal exchanging of experiences between members than to elaborate formal discussions, and I believe served its purpose well.

Mr. H. S. Taylor gave a very fine paper on "The Heat Insulation Value of Gypsum Roofs," illustrated by stereopticon views, and Prof. Ralph H. McKee, a very instructive paper on the "Utilization of Waste Sulphite Liquor for Alcohol Making."

At Copper Cliff, Ontario, the smelting of copper-nickel ore was thoroughly demonstrated by the International Nickel Co. and the question thoroughly discussed of the utilization of its waste gases to recover the SO_2 present for use in sulphite manufacture.

Work of Standing Committees

Our standing committees have for the most part made distinct progress. I will not attempt here to enumerate the work of the committees during the past year, but will leave this to be shown for itself in their various reports, which will be presented to our annual meeting on January 18, 1921.

I do wish to commend very highly, however, the efforts which have been put forth by the Committee on Education with special reference to the text books for the industry. This committee has met and overcome obstacle after obstacle, and deserves the praise and whole-hearted support not only of our Technical Section but of our whole industry. It will have a very interesting report to present at the annual meeting.

Two other committees which have been doing especially hard and conscientious work are the committee on testing moisture in pulp and the Committee on Mechanical Standards.

Membership

Our membership has grown steadily throughout the year, as is shown by the following table of comparison:

	Jan. 1, 1920	Jan. 1, 1921
Full members	98	108
Associate members	12	14
Junior members	17	27
Student members	14	17
Total	143	166

Summer Students

The plan which our Section undertook two years ago, in cooperation with the mills, of interesting college students to undertake jobs in the mills during the Summer vacation has been carried on successfully this year and it now seems evident that ultimately the industry will obtain a few valuable men in this way who otherwise might have been led into entering other fields of manufacture.

The essays which have been turned over to the committee of judges for awarding the three prizes of the Technical Section have in the main seemed to be of a higher order of merit than the average of those of last year.

This activity of the Section promises well for future results. There were 41 students listed on the records of the Technical Section as undertaking Summer work in the mills during the Summer of 1920, and from these students 14 essays were received for the prize competition.

Technical Section Research Department

Finally I wish to direct your attention to a piece of work of the Technical Section which gives promise of being one of its most important phases of work, given proper support. This is the development which has arisen through the previous efforts of our former committee, entitled the Advisory Committee to Forest Products Laboratory.

My predecessor in office, Mr. Stadler, in his report last year stated that "the Executive of our parent Association had authorized a substantial contribution towards the Superintendence of the Forest Products Laboratory," and since his report we have been advised that such contribution is not acceptable by the Government. It has seemed as though the establishment by ourselves of an effective research organization working on the technical problems of our industry through the rehabilitation of the pulp and paper section of the Forest Products Laboratory was almost a hopeless task. Recent developments, however, indicate that we have a possible solution to this problem.

Early in the year the Executive of the Main Association instructed your Chairman to appoint a committee from the Technical Section which should make a thorough investigation of the whole situation and report with recommendations to the main Association at its annual meeting in 1921.

Your Chairman thought it wise to defer the appointment of such committee until after the Summer meeting of 1920, and during the intervening months to get opinions from various members of the Technical Section and to arrange for a discussion of this question at the Summer meeting. This was done and the consensus of opinion brought out before the Summer meeting was to the effect:

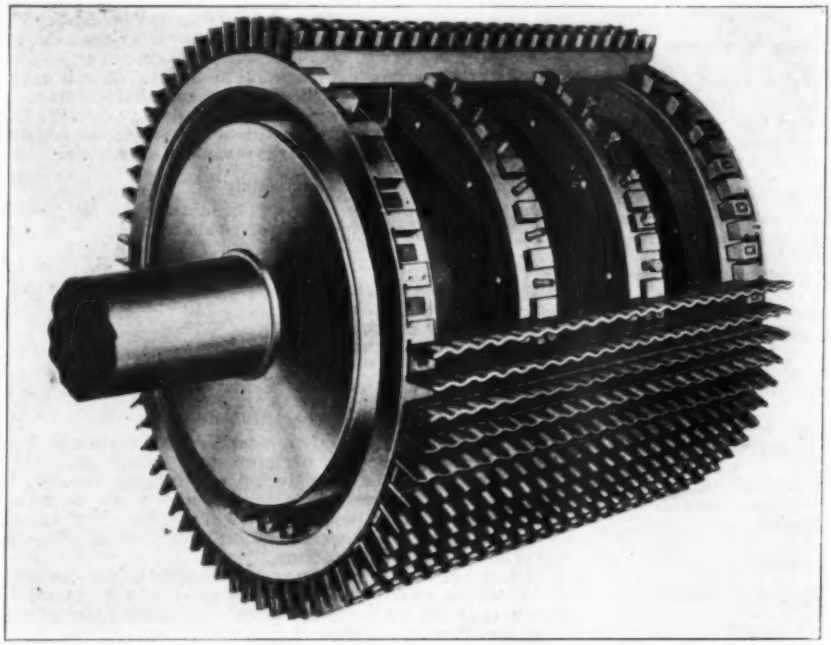
That knowledge of the actual accomplishments of the Forest Products Laboratory to date was insufficiently spread among our members;

That the benefits of an Association laboratory were not clearly enough understood by the majority of our manufacturers who would be asked to support such a laboratory; and, finally,

That a definite scheme for the accomplishment of the purpose in hand had never been presented by anyone.

It was further shown that the idea would very likely be further along at the annual 1921 meeting if, instead of having a Technical Section committee report to the Main Association, a joint committee be appointed, one-half from the Technical Section and one-half from the manufacturers.

This was done, and I am very much pleased to report that this committee has a very definite program to present to the



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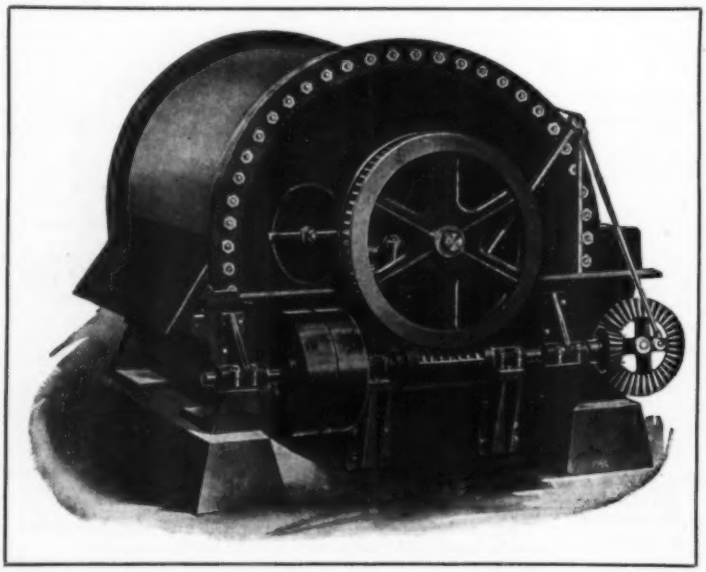

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Association and through it to the industry, at our forthcoming annual meeting.

While this annual report should be confined to the activities of the Technical Section during the past year, I feel I would be remiss in my duty as Chairman, while the above important matter is up for decision if I did not point out here the manner in which a well-conducted Association research laboratory could be of very particular benefit to the industry. Not all our Section members are Technical men, that is, trained in the laws of physics and chemistry underlying our industry, and it is to these non-technical men in particular that I wish to point out the advantages which might accrue from our having our own research organization.

There are innumerable scientific problems, the solution of which is possible and will immediately react to distinct advances in our manufacturing processes. I will go into details with one alone to show the possibilities.

We are most of us familiar with the fact that about a year ago the International Nickel Co. undertook an investigation upon the feasibility of erecting a plant to recover and liquefy the SO_2 being wasted to the air in their waste smelter gases. Some of us are familiar with the results of the investigation, namely, that the cost of this recovery was such that the price to the paper mills of the recovered liquid SO_2 was not sufficiently below the ruling price of sulphur to warrant the mills interested in giving up the use of powdered sulphur.

This decision was made because the present knowledge of sulphite making made us sure of only one benefit; namely, the elimination of our sulphur burning apparatus and process. This saving alone would not warrant any mill to get into the position of being tied up to liquid SO_2 with always a possibility in view of a large drop in the price of sulphur.

There is lacking to the trade a piece of information which if it had been available might have made the decision favorable to the use of liquid SO_2 even at a price higher than that of powdered sulphur. There are facts to be had through a research organization on this subject which may entirely change our present ideas on sulphite making.

We have in our industry advocates of cooking with high strengths of sulphite acid, and on the other side those who are as strongly convinced that high strengths are not economical. With liquid SO_2 available, we could make acid of strengths hitherto physically and chemically impossible, because from burning sulphur a fraction over 20 per cent SO_2 is the theoretically strongest gas which can be produced. We technical men know that there is a saturation limit with 20 per cent gas which would prevent the acid absorbing more than a very definite strength of SO_2, but that with 100 per cent gas from liquid SO_2 this saturation point would be raised very materially, thus allowing us to cook with acid strengths unheard of to date.

But what would this ability avail us? Theoretically, we would be able to reduce our cooking temperatures to a point where we might get increased yields of 15 to 25 per cent; also we might get pulp out of our digesters in six or seven hours which would be as easy bleaching as that made today in a twelve-hour cook, and which would be nearly twice as strong fibred.

This, however, is theory, and we know that these new conditions would entail new problems. For instance, our present sulphite bronze fittings would not stand up under the strain of high temperature and pressure in presence of this extremely high strength acid. Again, at the end of the cook, there would be so much SO_2 left in the acid that special new arrangements would have to be devised for its recovery; again, the action of 100 per cent SO_2 gas in our tower acid systems has not been determined, and the question remains to be determined whether under this condition of gas it would be advisable to make the strong acid in the tower or the digester itself.

With the possibilities of enormously increased yields, materially reduced steam consumption and cooking time, however, this becomes immediately a problem for a well organized association research department, since it is, in its entirety, somewhat too large a problem for the ordinary mill technical department to hope to tackle and solve.

I have gone into this amount of detail merely to show some of you how such a scheme as will be presented by your joint committee can be made to be of special vital benefit and importance to our industry, and I sincerely hope and trust that you men of the Technical Section, and particularly you manufacturers, will see into the future enough to realize that with proper financial backing plus hearty co-operation—and without this latter the scheme will fail—we have a wonderful opportunity to put this Canadian industry far in the lead in its own field. Problems exist in our industry in all its branches which when solved will prove as revolutionary as the one outlined above.

Finally I wish to thank most heartily all the members of the Executive Council of the Technical Section for their very enthusiastic support during the past year. Every one, when called upon, has done his part in full measure, and particularly do I feel grateful to our Secretary, Mr. Dawe, for his most helpful guidance in the performance of my duties as your Chairman.

Report of the Woodlands Section

J. B. White, Chairman of the Woodlands Section, presented the following report:

The past year has seen an increase in the number of members of the Woodlands Section and a greater interest taken in the improvement of logging conditions in all parts of the country.

A largely attended meeting of the members was held in Toronto on December 8th and 9th, at which time some very interesting papers were read on Swedish conditions of lumbering, and also interesting papers having to do with Canadian conditions of forest lands.

An interesting development of the present-day methods of logging has been the entrance of the airmen as a factor in woodlands work. Unquestionably the time is at hand when a great deal more use will be made of the airmen than at present in fire patrol and map work, and while in an experimental stage at the present time as regards equipment, flying is rapidly becoming a perfected science.

Several members of the Woodlands Section have expressed the desire to have a medium for exchanging ideas in regard to equipment used in logging and bush work.

During the year the American Association has also formed a Woodlands Section and there is every possibility of a certain degree of co-operation between the two organizations.

Report of Transportation Department

G. B. Ruickbie, on behalf of the Transportation Department, presented the following report:

During the past year your Transportation Department has given close attention to all transportation matters affecting the industry, and begs to report as follows:

In July last the Railway Association of Canada, on behalf of all Canadian railways, made application to the Board of Railway Commissioners for a general increase of 40 per cent in freight rates, it being claimed this amount was necessary to meet increased wages and operating expenses. Your Executive decided that this Association would not oppose such general increase as was found necessary, providing this industry was not singled out for a higher increase than others. Hearings were held by the Board of Railway Commissioners in Ottawa, commencing August 10th, and as a result Canadian railways were allowed to increase rates in Canada, east of Fort William 40 per cent; west of Fort William 35 per cent. New rates on this basis became effective September 13th, 1920. The order further stated that effective January 1st, 1921, the percentage of increases would be reduced to 35 per cent east of Fort William and 30 per cent west. Adjustment has been made to this basis.

Several exceptions were made to this general increase, the following being of interest to our members:

Crushed stone—No increase.

Coal—Rates 80 cents per ton or less, increase 10 cents per ton; rates over 80 cents, not over $1.50, increase 15 cents per ton; rates over $1.50 per ton, increase 20 cents per ton.

No modification of the above increase on coal was ordered for January 1st, 1921.

At the time the application of the Canadian railways for increased rates was being considered in Ottawa, the Interstate Commerce Commission at Washington announced that United States railways would be permitted increases in their rates sufficient to allow them net earnings equal to 6 per cent of the valuation set for the various groups of railways by the Interstate Commerce Commission, as provided for in the Transportation Act of 1920. Under this order railways operating in Official Classification territory (roughly, lines east of Chicago) were permitted an increase of 40 per cent; railways in Western Classification territory 35 per cent, and Southern Classification territory 25 per cent. On through rates between two of these territories an increase of 33⅓ per cent was allowed. Under this order the proportions accruing to United States railways on shipments to and from Canada were to be increased the same percentages as domestic shipments, and consequently, with the approval of the Board of Railway Commissioners for Canada, through rates between points in the United States and points in Canada were increased in some cases 40 per cent, in others 33⅓ per cent. No change was ordered in these International rates, effective January 1, and no exceptions were made of any particular commodities, so that the rates on coal from United States mines to the Canadian frontier were increased approximately 40 per cent, while

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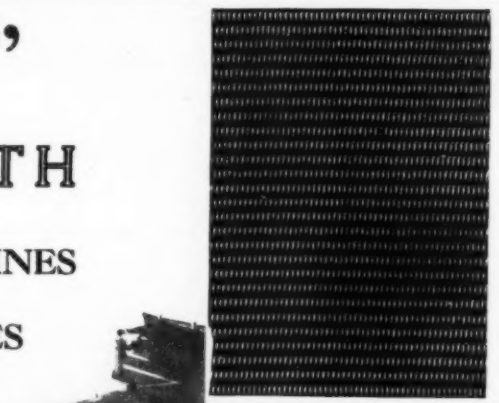

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the rates from the frontier to the mills were increased the specific amounts allowed by the Canadian board.

During the past year the Transportation Committee appointed by your Executive, with Mr. Guy Tombs as Chairman, has held several meetings and has endeavored to look after the interests of the industry as a whole as far as freight rates are concerned. During the hearing before the Board of Railway Commissioners in Ottawa last Summer strong representations were made that instead of rates on woodpulp and paper to United States points being increased 40 per cent, the basic rates should be increased 40 per cent and rates from other mills adjusted on the proper differences over or under the basic rates. Favorable consideration was promised by the railways as soon as the United States railways took similar action regarding rates from New England mills, and while it has taken longer than we anticipated to arrange such adjustment we are in hopes it will not be much longer delayed.

An appeal from the order of the Board of Railway Commissioners was taken by the Governments of Manitoba and Saskatchewan to the Governor in Council, but the order allowing the railways to increase their rates stands. Complaints have also been made by British Columbia interests against rates applicable in that Province, and by the Governments of Nova Scotia and New Brunswick jointly with local business interests against present rates to and from the Maritime Provinces. The Western Governments allege that improper discrimination exists in that rates in that territory are higher than in Eastern Canada. The Governor in Council has suggested that the board should investigate this feature. In view of these various complaints the Board of Railway Commissioners has announced that hearings will be held at various points throughout Canada, starting in April next, to investigate freight rates generally, and all having grievances will therefore have an opportunity of being heard.

Your Transportation Committee decided, at a recent meeting, that rates at present being charged our members on pulpwood and other raw materials should be carefully analyzed. In order to make a proper survey of the situation it will be necessary to get considerable information from the mills. Some of this has already been asked for and your co-operation in furnishing it is solicited.

On March 4th last the Executive authorized this department to audit inward freight bills for any members desiring to avail themselves of the service. A nominal charge of 1 cent per bill audited, was decided upon. Since that time a total of 11,350 bills have been audited, the amount realized by the Association for this service being $113.50. The following figures will give some idea as to how this arrangement is working out:

Total number of bills audited		11,350
	No.	Amount
Total claims entered	51	$3,498.13
Grand total	51	$3,498.13
	No.	Amount
Total claims paid	22	$1,283.58
Total claims withdrawn	3	213.56
Total claims outstanding	26	2,000.99
Grand total	51	$3,498.13

Only five members have so far taken advantage of this service, and of this number two have preferred to file their own claims with the railways. In such cases the expense bills are returned to them after auditing, with particulars of any overcharges discovered, and reference to the freight tariffs authorizing the rates which should have been charged. If the amounts of such overcharges were added to the above figures the totals would be considerably greater.

Special care is taken to see that any claims entered are based strictly on the legal tariff rates, thus avoiding any friction with the Railways Claims Departments. The three claims above referred to as being withdrawn were originally filed with the railways owing to a misunderstanding as to routing. When it was pointed out that the routes over which the shipments traveled had been specified by the shippers, and the railways were not responsible for the misrouting, the claims were withdrawn.

The number of claims entered does not represent the number of bills on which overcharges occurred, as where a number of shipments of the same commodities, moving between the same stations on account of the same firm, have been overcharged, one claim is very often made to cover all such shipments.

While rates which are being charged may be in accordance with published tariffs, it sometimes happens that they are on an improved basis, having in mind the service performed and rates in other localities on the same commodities. In several such cases this department has been instrumental in arranging reductions, which, of course, are benefits of a permanent nature to the mills interested.

With the great number of changes which have occurred in freight rates in recent years, tariffs are very complicated, and as the indications are that in the future still further adjustments will be made, it would seem important that all freight bills should be carefully checked.

Requests for freight rates, tracing shipments, and other information are being received from a number of our members, from time to time, and are being given careful attention.

Amendment of By-Laws

The following amendment of the By-Laws was proposed and unanimously adopted:

Article 10

The annual dues for members shall be as follows:

Assessments on the normal annual quantity of products available for sale—

On chemical pulp.....3 cents per ton
On mechanical pulp.....2 cents per ton
On newsprint, board, wrapping, sheathing and miscellaneous.....4 cents per ton
On book papers, writing, coated and tissue papers.....5 cents per ton

The Executive Council shall have power to make special assessments upon members as such assessments are found necessary.

Election of Officers

Major Percy B. Wilson, Vice-President and General Manager of the Spanish River Pulp and Paper Mills, Ltd., Sault Ste. Marie, Ont., was elected President for the ensuing year, and George M. McKee, General Manager of the Donnacona Paper Company, Ltd., Donnacona, Que., Vice-President.

Luncheon

There was a military aspect at the luncheon given Friday at the conclusion of the convention, which indicated the strong part the men of the forest and allied industries had taken in the war. The chair was taken by the new President, Major Percy B. Wilson, while with him at the head table were General Sir Arthur Currie, K. C. M. G., Principal of McGill University, the guest of the day, Brigadier General J. B. White, Colonel George H. Chahoon, Jr., Colonel W. E. Haskell, of the International Paper Company, a veteran of the Civil War, Lieutenant Colonel Sir William Price and Private George M. McKeen, a forestry man who served overseas in the ranks.

The feature of the luncheon was the address given by General Sir Arthur Currie on the relations between the university and the forestry industries, in which General Currie dealt with the close connection between the scientific knowledge that could be secured at the universities, and the necessity for such knowledge in order to make the most of the Canadian forest resources. A vote of thanks was moved by Colonel Haskell, with a standing vote, when three cheers were given for General Currie.

The Annual Dinner

In the evening the annual banquet of the Association was held in the ball room of the Ritz-Carlton Hotel. There was an attendance that completely filled the capacity of the place while a number of ladies of the party were interested spectators from the galleries. The dinner was enlivened by a musical programme.

In opening, the new President, Mr. Percy B. Wilson, said that the pulp and paper industry had enjoyed a year of prosperity, and he hoped that period was not ended. Everybody during the year had made more money, and even the publishers had made more money.

"During the year," said Mr. Wilson, "the work of the Association had included the establishment of the Bureau of Research, under the chairmanship of Colonel Jones, which it was hoped would lead to the furtherance of scientific forestry. He pointed out that during the past year the governments of both Quebec and Ontario had secured a large proportion of their revenue from the operations of the forestry workers and the pulp and paper industry, and claimed that at least a portion of this taxation should be returned in reforestation work." "We have nothing to hide," concluded the new President. "What we want to do as an Association is to put all our cards on the table and play the game." He then briefly introduced Honorable Sir Henry Drayton, K. C. K. B., M. P., Minister of Finance, who was given a cordial reception.

Sir Henry Drayton

Sir Henry Drayton congratulated the Canadian Pulp and Paper Association on the splendid showing they had made,

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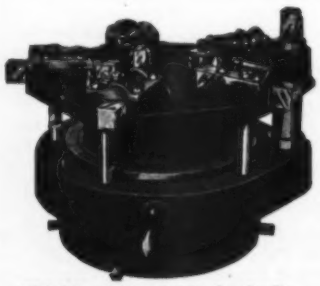

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remarking that their industry had done much for the advancement of the Dominion, and bade fair to do much more.

He said that in 1881 there were only in Canada 41 small paper mills, with 1,500 employees, with a total wage bill of $460,000, while in 1919 there were 99 large mills, with 267,665 employees, while the wage bill distributed amongst the men engaged in all these activities amounted to $32,323,000. It could easily be understood that the industry had done great things, and had become one of the great factors in the progress of the Dominion.

He said that exportation of pulp and paper last year amounted to some $46,000,000, most of it to the United States, or 10 per cent of Canada's total exports, which meant much in these days of adverse exchange. This year already nearly $50,000,000 worth of these products had been exported, well over 11 per cent of Canada's total exports. He hoped this would grow, after fair provision had been made to supply the home market.

After doing so well with newsprint, Sir Henry expressed surprise that Canadian manufacturers had not done so well with other grades of paper, with importations of over $10,000,000, of which $9,000,000 came from the United States. He thought that, with so much of the raw material, Canadian industry should, at least, turn out her own supplies. "No country, no business," he remarked, "can become great that does not do things in a big way."

President P. B. Wilson assured the Minister of Finance that the pulp and paper interests would continue to keep their mills running and continue to do big business in a big way; that they would continue to keep Canadian publishers supplied with their paper at reasonable prices, and would willingly bear their fair share of any taxation necessary to meet the burdens of the country.

Hon. Walter Mitchell

He then called upon Hon. Walter G. Mitchell, K. C., B. C. L., Provincial Treasurer of Quebec, who expressed the hope that the present agreeable relations between the Provincial Government and the pulp and paper industries would continue. While it was true that the latter had contributed 15 per cent of the Provincial revenues last year, the Government looked upon the pulp and paper men as partners in directing the Province, with the only proviso that they should see that all taxes were properly expended.

Annual Meeting of the Technical Section

THE annual meeting of the Technical Section of the Canadian Pulp and Paper Association was called to order by President L. H. Shipman on Wednesday morning at 10 o'clock at the Ritz-Carlton Hotel, Montreal.

After a short address by the President and the preliminary business of the meeting, the following report of the Committee on Education was presented by Chairman T. L. Crossby:

Committee on Education Report

Your committee has continued to give much attention to co-operation with the Joint Executive Committee on Text Books. This has consisted in the reading over of manuscripts and conferences with the Editor, Chairman and Secretary. On two occasions since our last annual report your committee has met the Committee on Education of the T. A. P. P. I. in full session at New York in April and at Saratoga in September. We are pleased to report that great singleness of purpose and unanimity has characterized these meetings, and that throughout the industry the greatest interest is being maintained in the production of the text books.

Efforts have been concentrated on Volume 1 containing Arithmetic, Elementary Applied Mechanics, How to Read Drawings, and Elementary Physics, in order to produce specimens for this meeting. Volume 2 will contain the other preliminary matter, Mechanics, Hydraulics, Elements of Electricity, and Elementary Chemistry. The work for this volume is all in the printer's hands. The issuance of the preliminary matter in two volumes will make the complete set of five volumes instead of four.

To expedite matters, it has been found advisable to engage a draftsman conversant with the industry to assist the Editor in preparing matter for illustrators. A good man has been engaged to work at St. Annes, and it has been found possible to reduce the staff at Scranton by one.

As an illustration of the manner of preparing the manuscript, we might cite the section on the paper machine. This manuscript was prepared by Mr. Brassington and passed on by the Editor to two groups of paper mill superintendents. The first group was that of superintendents in the Niagara Peninsula, representing sulphite, news, book, writing, tissues, and light wrappings. These gentlemen with members of your committee took one evening to look through the manuscript, then divided it between them for critical reading, and after two weeks had another meeting, exchanging criticisms. This resulted in many useful suggestions, a better statement of some points and the correction of errors that could only be noted by men of lifelong practical experience. The manuscript is now in the hands of a similar group in the neighborhood of Holyoke, Mass.

The Editor, Mr. Stephenson, is a member of this committee, but his fellow members feel it will not be amiss to say that he has labored long, patiently and effectively, and that the industry, as a whole, is greatly indebted to him and his editorial colleagues, Messrs. Foster and Clark.

Student Work

Members of your committee have addressed students at McGill and Toronto Universities, on the general principles of the industry. During the vacation season of 1920, some 60 students of Canadian universities were employed in the mills. This is just twice the number for 1919, and is a very good evidence of the interest of our universities and students in the industry, and also indicates that the mills appreciate the possibility of growing good stock for technical staffs. Fourteen essays of high literary and technical excellence were entered in the competition.

The thanks of this committee are given to the mills whose co-operation makes this effort possible, and to Mr. Dawe who has done nearly all of the work incidental to putting the universities in touch with the mills.

At this juncture, R. S. Kellogg, member of the Joint Executive Committee on Vocational Education, presented a copy, "hot off the press," of the first volume of the text book on the Manufacture of Pulp and Paper. The first fruit of the labor of this committee was received with satisfaction and approval. Mr. Kellogg said that the next action in order must be the placing of the book into the hands of every student of papermaking.

It is said that nearly 100 students are now attending vocational schools conducted by mills, and that more and more the mills are signifying their intention of starting these schools.

Volume 1 of the Text Book

It might be well to describe briefly this first volume. It is composed of about 450 pages, divided into four sections.

Section 1 treats the subject of Arithmetic; Section 2, Elementary Applied Mathematics; Section 3, How to Read Drawings, and Section 4, Elements of Physics.

Practical examples for practice and study, and review questions have been incorporated in the text, making it adaptable to not only the classroom but for home study and as a reference book. The book is published by McGraw-Hill Co., of New York City.

Committee on Abstracts and Publications

J. N. Stephenson presented the following report of the Committee on Abstracts and Publications:

Your committee reports having been at work continually since the last meeting. An optimist might call it a progress report. We have arranged for the abstracting British Journals by the Librarian of the Spanish River Pulp and Paper Mills at Sault Ste. Marie. Several tentative arrangements for an abstractor to take care of Swedish and Norwegian journals have so far been without result and we are now endeavoring to make arrangements for these periodicals.

Our co-operation of the American Committee continues, and Mr. C. J. West, of the A. D. Little, Inc., is doing most of the abstracting across the line.

We hope during the coming year to arrange for better service with regard to reviews of books relating to the industry.

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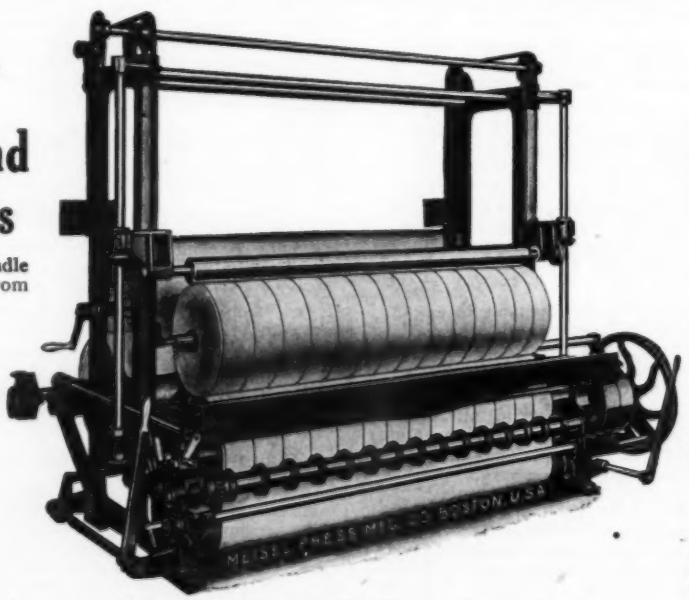

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In the issue of the Pulp and Paper Magazine for December 16th, there is an article by Miss A. B. Collins, Librarian of the Spanish River Pulp and Paper Mills, on "How a Paper Mill Uses the Literature." Appended to Miss Collins' article is a revised classification of the literature according to the plan worked out some years ago by your committee. Respectfully submitted—O. F. Bryant, R. L. Campbell, S. Wang, J. N. Stephenson, Chairman.

John Stadler, Chairman of the Committee on Mechanical Standards, presented a report which will be printed in a subsequent issue. He stated that it was the opinion of the committee that the majority of the mills have not fully realized the advantages that would be obtained from standardization of mechanical equipment.

Committee on Testing Moisture in Pulp

The report of the Committee on Testing Moisture in Pulp was presented by Chairman E. B. Slack as follows:

Your committee beg to report the following:

1. The only pulp on which your committee have recommended no decided methods for testing are dry pulp in rolls and dry pulp made into sheets and then pressed into bales.
2. Your committee have previously pointed out three methods that are in use in testing same, namely:
   1. The strip method.
   2. The disc method.
   3. The wedge system as used in Great Britain and Scandinavia.

Your committee feel that inasmuch as these three methods are standards in themselves, it is mainly a question as to which one is the most suitable to be used, depending on conditions under which tests are taken. Your committee have noticed that both the American and English Technical Sections are working on these problems, and have not as yet decided which method is most suitable.

Your committee feel that a committee should be composed from these three different Associations and have power to decide as to which of above methods, or if all three, should be used in matters of testing dry pulp in rolls or bales.

Report of Committee on Chemical Standards

A. G. Durgin, Chairman of the Committee on Chemical Standards, presented the following report:

Strength of Sulphite Pulp

Your committee has reviewed the report of the committee presented on January 30th, 1919, by Messrs. Decew, Hovey, Cooper and Mason, and has no suggestion or alterations to make in reference to the methods in the report.

Through correspondence with different laboratories we have discovered that the present Ball Mill method for measuring strength of sulphite does not give comparable results when performed by different operators. This leads us to believe that the method produces results which may be considered more directly as a measurement of the effect of beating than as a true determination of sulphite strength. It is our recommendation that this particular question be referred to a committee on sulphite pulp for consideration and that this committee be requested to consider the subject in its broad aspect and endeavor by co-operation with different mill laboratories to develop a method which will give a true indication on the actual strength of sulphite pulp.

Coal Tar Dye Stuffs

Your committee has made several examinations into the various coal tar dye stuffs marketed through Canada. The differences in quality in dye stuffs sold under the same name has been particularly noticeable, and it is the recommendation of your committee that a special committee be appointed to completely review and carefully study the entire question of dye stuffs in relation to their use in paper manufacture.

Paper

This committee would recommend to the consideration of the Association a detailed study of methods which can be presented for adoption as standard for grading of newsprint and wrapping papers. We would recommend development of this study with the idea of making a report of quality on a definite percentage basis. We believe that each of the following factors should be considered: Weight, Finish, Cleanliness, Strength, Formation, Thickness, Color and Moisture.

In the opinion of the committee, it appears reasonable that a definite value can be derived which will represent 100 per cent, and that this value can be preserved in the form of comparison standards where such standards are needed. Working from these standards the percentage value of each individual factor may be determined, e. g., the paper may have a formation of 90 per cent, finish of 85 per cent and cleanliness of 60 per cent, etc. The committee would further recommend that weighted values be assigned to each quality factor. To the end of final numerical quality percentage may be determined and percentage value representing the actual value of the paper.

Water

Ignite 2 grammes of the clay in a porcelain crucible at a red heat. The loss in weight X 50 = per cent of free and combined water.

Colour

The comparison of different clays for color or whiteness should be carried out of both the dry and the wet clay.

The dry clays should be placed side by side on a porcelain slab for examination and comparison with mill standards.

The wet clays should be made up with water to the consistency of a thick paste and compared in the same manner.

Fineness

Fineness should be measured by mixing a 20-gramme sample with water, rubbing up in a mortar and serving through a 100-mesh sieve.

The residue remaining shall be dried and weighed.

Elutriation

Weigh 2 grammes of the samples into a Nobel or Schultze. Elutriate apparatus and continue flow of water at a rate not to exceed 20 c. c. per minute until an effluent from the last reservoir is free from the suspended material. Filter, dry and weigh the residue in each reservoir separately.

Alternative Methods

Weigh a 2-gramme sample into a 2-meter round bottom flask and introduce water through a 5 m. m. tube just touching the bottom of the flask. From the effluent to a rate not greater than 20 c. c. per minute continue flowage until the effluent is free from the suspended particles. Filter, wash, dry the residue in the flask.

Plasticity

Make up a thin starch paste by boiling 1 gramme of starch in a litre of water. Place 100 c. cs. of this paste together with 5 grammes of the sample of clay in a graduated glass and shake well. Allow to stand at rest for 24 hours. The finer and more plastic the clay, the greater its miscibility with the starch paste—i. e., the less it settles to the bottom of the vessel. Various samples may be compared in this way.

Department of Technical Research

The report of the Committee on Research, which appears in the account of the parent meeting on another page, was then read by Chairman Colonel C. H. L. Jones. Free and open discussion of the matter was invited by President Shipman before recommending it to the parent body for adoption. Mr. John Stadler suggested an amendment to the effect that the technical men pledge their full moral support and hearty co-operation to the new department of technical research outlined in the report, and after a lengthy discussion in which the plan seemed to be in unanimous favor, the report was adopted with the suggested amendment.

During the course of this discussion, an interesting address was made by Dr. Ruttan, of McGill University, wherein he described the bill now before the House providing for a National Research Institute. He spoke of the progress which has been made in England, where some 20 or more industrial Associations each have their own experimental laboratory with a well-paid director in charge. "That country has found," he said, "that a closed door has shut out more than it has shut in." It is provided, he said, to have the Government of the proposed institute under the control of a research council and not under civil service. The passing of this Act, he said, would be the means of providing a central laboratory for the pulp and paper industry and could be established in 18 months. Support of the measure was asked.

Change of By-Laws

A change was made in the By-Laws to the effect that anyone over 28 years of age, having a technical education or a practical experience in the pulp and paper industry and acceptable to the Association is eligible to membership. The object of this legislation is to permit practical men to become full members.

Election of Officers

The following were elected officers and members of the Council for the ensuing year: George Carruthers, Interlake Tissue Mills, Ltd., Merritton, Ontario, Chairman; O. F. Bryant, Laurentide Co., Ltd., Grand Mere, Quebec, Vice-Chairman; Dr. John S. Bates, E. B. Wardle and P. J. Murer, members of the Council.

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Addresses

An interesting address on the subject of Insurance of Pulpwood was delivered by F. J. Hoxie. Slides were thrown on the screen to illustrate it, and a lengthy discussion ensued. Other papers of the day included one by J. L. Gartland on Microscopy and the discussion led by H. N. Lee of the Hammermill Paper Co., Erie, Pa. Mr. W. B. Campbell read a paper on Beating.

Through the courtesy of Riordan Company, Ltd., a film of their new Kipawa mill was shown which was both entertaining and instructive.

The Smoker

The seriousness of the convention business gave way to the spirit of fun and merriment at the informal smoker held in the grill room of the Ritz-Carlton on Wednesday evening. The entertainment was in charge of Jimmie Rice of the Rice Studios in Montreal, who successfully made the party one of genuine good fellowship. Various members of the Association contributed their share to the fun-making by either singing songs or telling stories. Some excellent boxing bouts were staged, among them being a welter-weight contest between Moe Herscovitch and Aleck Thompson, members of the Montreal Amateur Athletic Association. All the bouts were evenly matched and created a lot of enthusiasm. The evening closed by the singing of American and Canadian patriotic anthems.

The following day, Thursday, was devoted to the reading of two papers: "Speed Interlock as Applied to Paper Machine Drives," by F. G. Warburton, and "The Ventilation of Paper Machine Rooms," by Howard S. Taylor. Both of these papers are published on another page of this issue.

"From the Forest to the Press"

An entertainment was furnished by Messrs. Price Bros., of Quebec, on Thursday evening, consisting of a private screening of a film, "From the Forest to the Press." The ladies were invited to attend and the ball room was filled to capacity. The picture proved one of unusual interest and at times of much beauty.

Newsprint Service Bureau Meeting

AT the regular meeting of the Newsprint Service Bureau, held at the Ritz-Carlton Hotel on Friday, the 21st, Secretary R. S. Kellogg said in part:

"The State of Mississippi has the smallest daily newspaper circulation of papers printed within its borders of any city in the United States, 38 individuals for each copy of any paper. The District of Columbia prints more papers for its size than any of the separate States, and the State of Massachusetts leads the States, with one paper printed for every two individuals in its area; New York State is second, and Missouri and California are tied for third honors as daily newspaper readers.

"This table of newspaper circulation shows one thing conclusively, and that is that if there is a newspaper printed in New York for every 22 inhabitants, there is a prospect of a great future demand for daily newspapers in such States as Mississippi or North Dakota.

"This means that future consumption of newsprint will increase. It means that steps must be taken by the industry to secure a continuous supply of raw material for future consumption, and that means that there must be protection of the nation's forests, such as is now being asked by the Congress of the United States in the Snell bill, which is supported by the National Forest Program Committee, whose membership includes both the paper manufacturers and the American Newspaper Publishers' Association.

"Forestry legislation is asked not to curtail consumption of forest products, but to supply sufficient raw material to meet the future demand. While this legislation is already before the American Congress, there is the same need of adequate protection of the forests on the Canadian side of the international, both as to markets and manufacture, as well as to the source of the raw material."

Mr. Kellogg's figures, which follow, show the number of inhabitants in each State for every copy of a daily paper published therein:

Alabama	11.9	Arizona	5.2
Arkansas	14.0	California	2.5
Colorado	3.1	Connecticut	3.8
Delaware	5.3	District of Columbia	1.9
Florida	7.2	Georgia	9.4
Idaho	7.3	Illinois	2.9
Indiana	3.7	Iowa	3.9
Kansas	5.4	Kentucky	7.8
Louisiana	7.9	Maine	6.2
Maryland	3.7	Massachusetts	2.0
Michigan	3.8	Minnesota	3.6
Mississippi	38.0	Missouri	2.5
Montana	5.1	Nebraska	4.0
Nevada	4.9	New Hampshire	7.4
New Jersey	5.7	New Mexico	18.0
New York	2.2	North Carolina	13.6
North Dakota	10.4	Ohio	2.8
Oklahoma	6.8	Oregon	2.8
Pennsylvania	3.2	Rhode Island	3.3
South Carolina	14.8	South Dakota	9.1
Tennessee	6.8	Texas	6.4
Utah	4.5	Vermont	6.9
Virginia	8.6	Washington	3.0
West Virginia	10.0	Wisconsin	5.1
Wyoming	7.5		

National average, 1 daily newspaper for every 3.8 individuals.

The following officers were re-elected: P. T. Dodge, International Paper Co., President; C. A. Babcock, Wisconsin River Paper and Pulp Co., Vice-President; R. S. Kellogg, Secretary-Treasurer. Executive Committee: P. B. Wilson, Spanish River Pulp and Paper Mills; W. E. Haskell, International Paper Co., and J. L. Apedaile, Price Bros. & Co., Ltd.

Woodlands Section Meeting

BRIGADIER GENERAL J. B. WHITE presided at the meeting of the Woodlands Section on Wednesday, January 19th, at the Windsor Hotel.

O. M. Porter, Secretary of the Woodlands Section of the American Association, made a strong plea for co-operation in Canada in forming what will be known as the International Forest Experiment Station. A station of this sort is now in operation in the States, the principal work of which has been, so far: the gathering of regular, dependable statistics on the production and costs of pulpwood; the development of practical woods operation costs accounting system for the pulp and paper industry; and the collecting of all important information secured by experiments made by different paper companies throughout the country.

"The idea of the international station," said Mr. Porter, "is (1) to exploit and experiment with all new mechanical devices in woods operations; (2) to collect funds for experiments along the lines to be provided by interested pulp and paper companies; (3) to investigate new methods of management of forest lands; and (4) to issue reports giving results of all experiments to all co-operating companies."

D. A. Crocker, of the Eastern Manufacturing Company of Bangor, Me., accompanied Mr. Porter, and assisted him in explaining the ideas of co-operation between the two countries in regard to all branches of the paper industry, which the American Association had authorized them to suggest.

The station itself, Mr. Porter explained, would be only a central office. All experiments to be actually made at different company plants, to which these experiments will be assigned by the Governing Committee.

A committee was formed of T. F. Kenney, Wm. Anson, T. E. Draper, and Elwood Wilson to co-operate with the American Committee to study the question of the proposed International Experimental Station.

Officers Elected

The following officers of the Woodlands Section of the Association were elected:

Chairman, S. H. de Carteret, Brown Corporation; Vice-Chairman, W. McE. Bowden, Laurentide Company, Ltd.; T. F. Kemny, James MacLaren Company, and B. F. Avery, Spanish River Pulp and Paper Mills, Ltd.

The Papermakers' Chemical company, Easton, Pa., and the John Richardson company of Boston, have filed libels in the United States court against the Brazilian steamship Ayuroca to recover damages claimed to have been done to a cargo of china clay brought from Fowey, England. The former complainant alleges damages to the extent of $12,000, and the Richardson company $20,000. The cargo was originally shipped from Fowey on the Brazilian steamship Igasseu, which put into the Azores Islands in distress. It was transferred there to the Ayuroca. It is claimed that the holds of both vessels were dirty and wet when the cargo was received, causing the damage.

Dominion Engineering Works, Ltd.

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HIGH SPEED NEWS MACHINES

Of Modern Design and Construction. Fourdrinier and Cylinder Machines of All Kinds. ROTARY SCREENS (System Spangenberg) for Pulp or Paper

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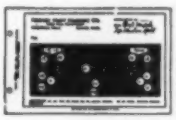
Operating Modern Machine Shop and Iron Foundry equipped to handle the largest classes of

GENERAL MACHINE WORK

PIONEERS *Three Departments Specializing for Service* ORIGINATORS

Registered Wood Rolls

For all makes and sizes of Machines, including Textile, Paper, Laundry, Tanning, etc.



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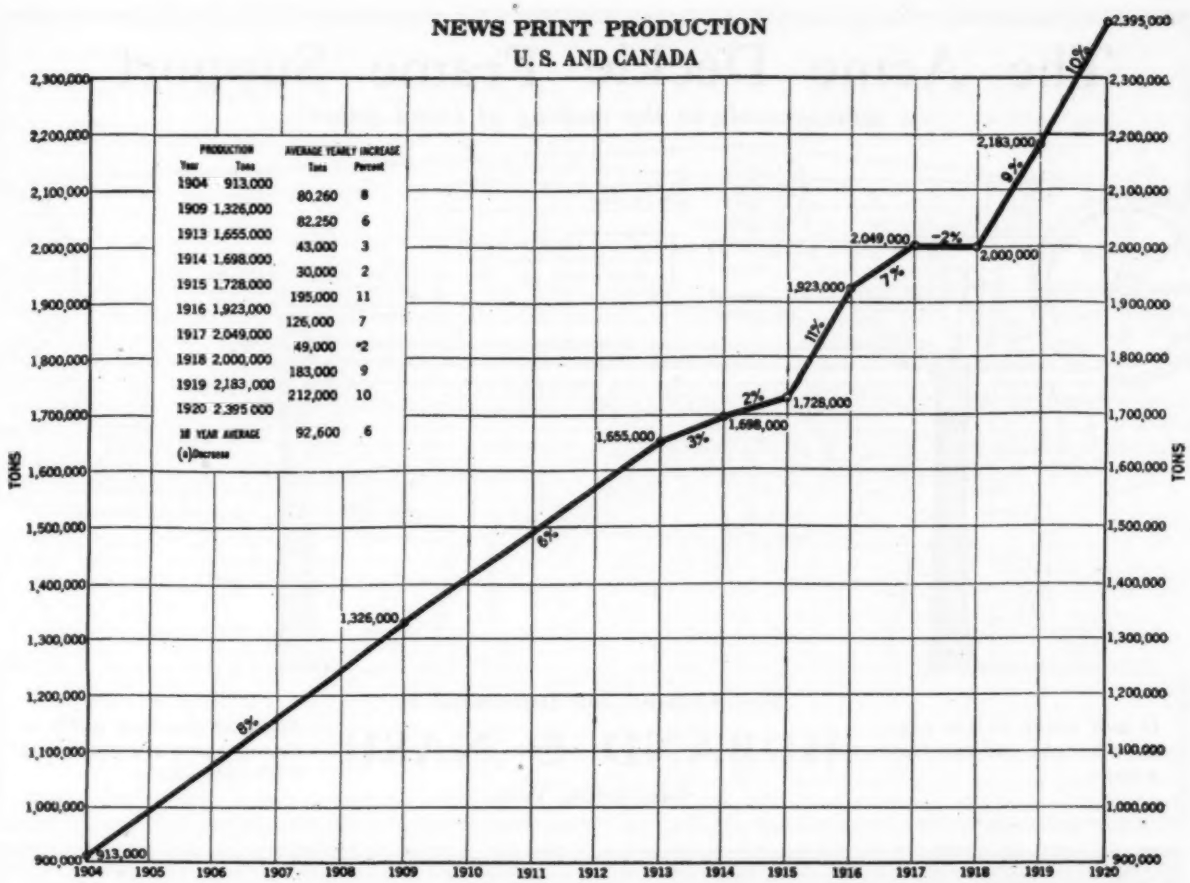

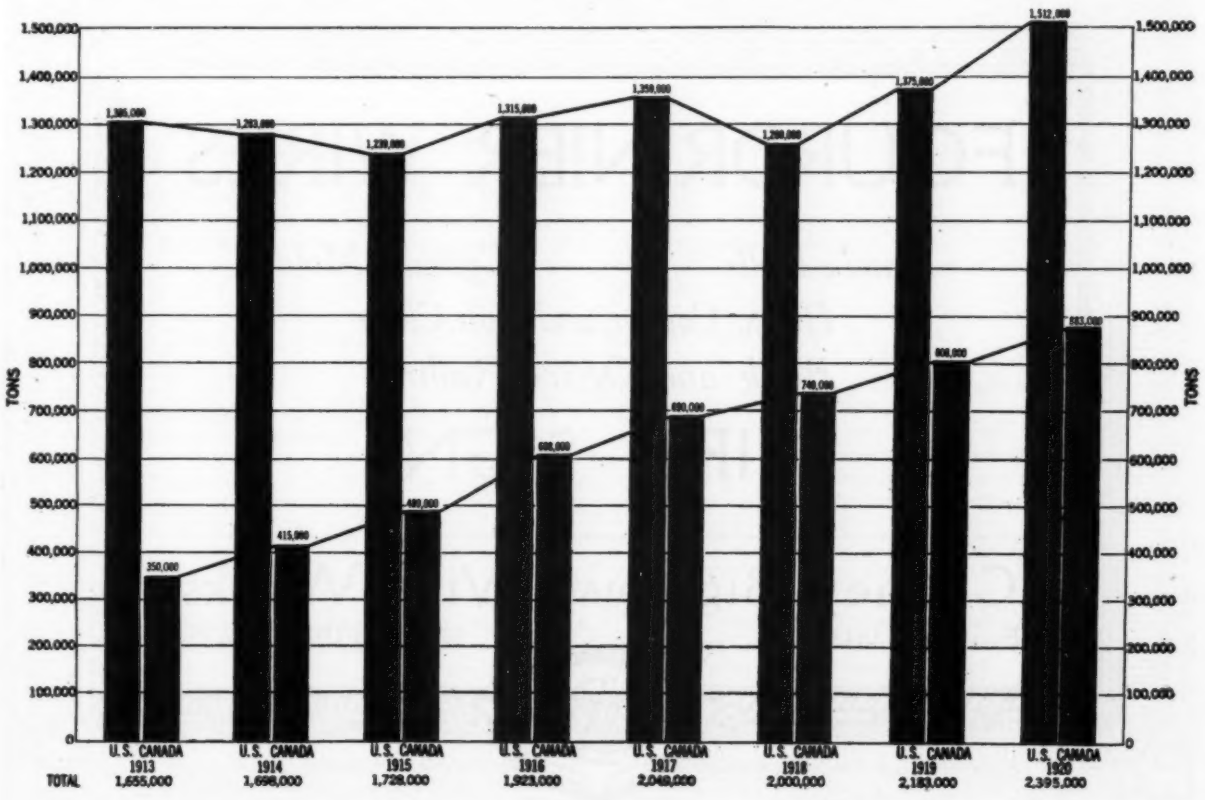

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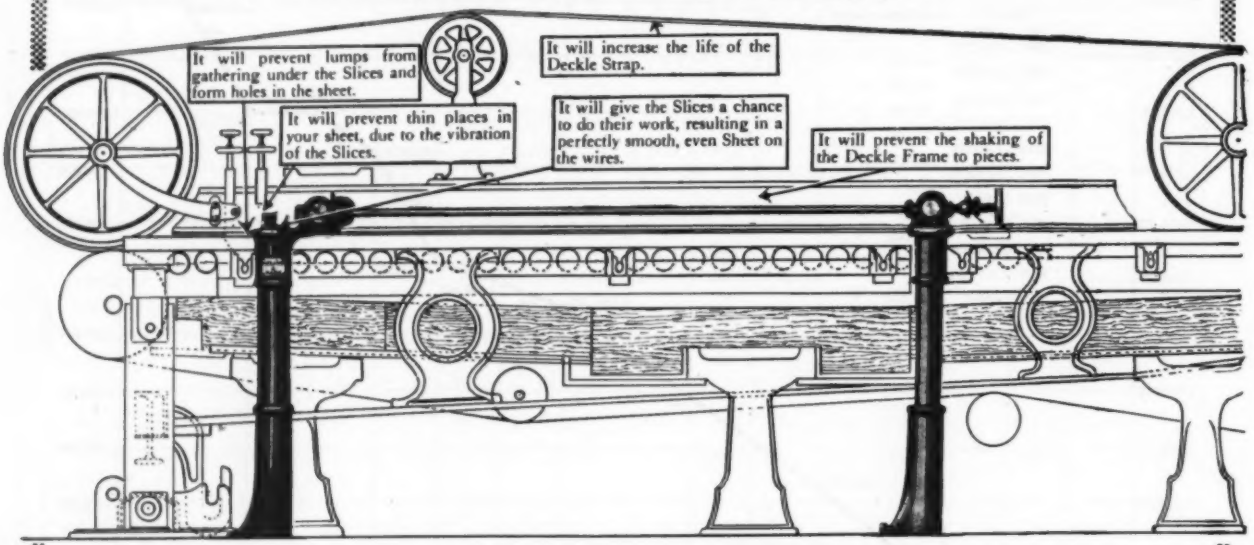
"is indispensable to the making of Good paper"


It will prevent lumps from gathering under the Slices and form holes in the sheet.
It will increase the life of the Deckle Strap.
It will prevent thin places in your sheet, due to the vibration of the Slices.
It will give the Slices a chance to do their work, resulting in a perfectly smooth, even Sheet on the wires.
It will prevent the shaking of the Deckle Frame to pieces.

It will make better edge, save breaks and take less power.

Manufactured and Distributed by

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Most of the best mills in this country are equipped with this device.

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Dandy Rolls *Cylinder Molds*

Brass, Copper and Iron Cloth

Bank and Office Railings

WIRE SIGNS

Cheney Bigelow Wire Works

Established 1842 SPRINGFIELD, MASS.

Cost Association Men Active

Durward E. Burchell, Professor of Industrial Accounting at Harvard university and ex-President of the Cost Association of the Paper Industry, spent two days recently at Watervliet Paper company's plant at Watervliet, Mich., in order to examine the work already done and to give further instructions regarding the cost accounting system now being installed by him at that plant. We understand that the Watervliet Paper company is very pleased with the tactful manner in which this work has been handled and the progress made to date.

It is mainly due to the splendid work done by Professor Burchell, B. E. Hutchinson, treasurer of the American Writing Paper Co., S. L. Bush, manager of research for the Crocker-McElwain and Chemical Paper Mfg. Cos., Col. B. A. Franklin of the Strathmore Paper Co., and others of the Cost Association's officers, that this Association's membership now numbers well over 100 and is steadily increasing.

J. A. Lemmon Resigns

The American Writing Paper Company announces the resignation of Mr. J. A. Lemmon, who has been manager of the Chicago office of the company, located at 1601 Otis Building, Chicago, Illinois. Mr. Lemmon has not yet announced any further connection.

The vacancy has been filled by the appointment of Mr. A. Carey Huls, formerly manager of the Cincinnati branch of the Eagle-A organization. Mr. Huls is thoroughly conversant with mid-western conditions and already has a wide acquaintance among the printing and paper trades in Chicago and vicinity.

Alexander B. Auld has announced the formation of the Auld Paper Company, Inc., for the transaction of a general paper business in New York City. Mr. Auld, president and general manager of the new company, was with the American Writing Paper Company for upwards of eight years, and recently was sales manager for the L. Schulman Paper Company of New York.

Leo W. Bowmall, vice president and treasurer of the American Woodpulp Corporation, of 347 Madison avenue, New York, recently returned from a business trip to Europe. Mr. Bowmall reports that he found manufacturing conditions in the Scandinavian countries bad but that there were fairly large supplies of wood pulp available there to American buyers. James Rosenberg, president of the company, is still in Europe, and probably will remain abroad until the spring.

New Representatives

The following changes and additions to list of representatives of the John F. Byers Machine Co., Ravenna, O., are announced:

Mosscens, Limited, are now exclusive sales representatives in Canada, with offices at Montreal, Toronto, Winnipeg and Vancover.

Edward H. Bacon company of San Francisco, are now exclusive distributors for Northern California and the Northwest, which includes Washington, Oregon and Nevada.

Don A. Rathburn company, El Paso, are the exclusive representatives for the Panhandle section, New Mexico and Northern Mexico.

F. A. Devlin, formerly president of the Empire Engineering and Equipment company of Pittsburgh, who represented Byers in the Pittsburgh district for the last five years, has severed his connection with that company, to represent Byers exclusively in that section.

The Mountain Mills Paper Company, of Lee, Mass., have opened a New York office at 225 Fifth avenue under the management of their eastern sales representative, H. M. Van Vaulkenberg. The company found it necessary to establish a New York office in order to facilitate service to its constantly growing patronage among the consumers in the metropolitan district of grease proof parchment paper which is the exclusive product of its mill.

The Lagerloef Trading Co., Inc., have opened an office in Chicago, Suite 1932, Conway building, 111 W. Washington street, telephones Main 1770-1771. Mr. Robert E. Krudener is in charge of the same.

Shuttleworth, Keiller & Company, Inc., paper and paper bag manufacturers and merchants of 474 West Broadway, New York, have filed notice of an increase in capital from $75,000 to $2,000,000.

Notice has been given of the appointment of the Industrial Trust company of Providence, R. I., to act as receiver in the operation and conduct of the business of the American Wringer Co. of that city.

Jeffrey Issues New Catalog

The Jeffrey Manufacturing Company, of Columbus, Ohio, have just issued their new catalog No. 257 on Jeffrey standardized scraper conveyers, which is now ready for distribution, and will be sent free to interested persons upon request.

This catalog features both single and double strand conveyers designed to handle all kinds of loose products in manufacturing and mining industries, power plants, retail coal yards, canning plants, sugar mills, and practically all other industries.

The many pages of instruction, specifications and dimensions given have been compiled in such a way that the engineer, and often the purchaser who is more or less unfamiliar with engineering problems, may easily select the right conveyer to fit his needs, saving the time heretofore required in making drawings and layouts, special designing, pattern making, etc.

Bird and Son, Inc., Issue Handsome Book

A very handsome book has just been issued by Bird & Son, Inc., East Walpole, Mass., on the occasion of their one hundred and twenty-fifth anniversary. It carries a message of cordial greeting and goodwill to their business associates and to those with whom they have relations throughout the world.

The book is a graphic record of this manufacturing enterprise, extending throughout a century and a quarter, under the guidance of three generations of Massachusetts paper makers.

A beautiful arrangement of type matter and halftone illustrations, the book is a marked accomplishment of the printer's art. It is printed in two colors of ink on dull coated enamel, and bound in a flexible embossed cover, making it altogether a book worth keeping.

Two Belting Publications

Edward R. Ladew Company, Inc., of New York City, have just issued two publications called "The Proof Book" and "Ladew Leather Belting."

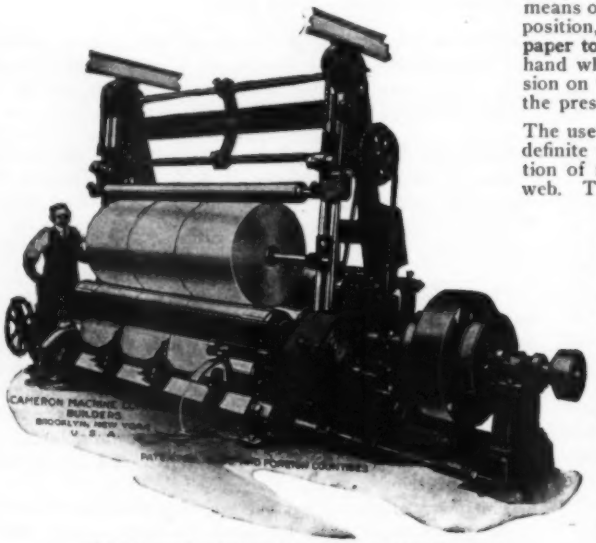
"The Proof Book" is a compilation of evidence of the dependability of Hoyt leather belting in service, with a brief discussion of some of the fundamentals of belting economy. The illustrations are from actual installations, showing Hoyt belts in service over various periods up to 44 years. And a variety of difficult drives are pictured.

"Ladew Leather Belting" is an 80-page catalog, describing the manufacture of Hoyt leather belting from the rough hide to the finished product. Belting rules and tables are given, with data sheet for analysis of belt drives for highest economy. Belting accessories are also included.

"CAMACHINE 18"

A Heavy Duty Slitting & Rewinding Machine for Paper and Board Mills

CAMACHINE-18 may best be described as a "Universal Type" Slitting and Rewinding Machine; that is to say, the same features that make the machine highly efficient as to speed and quality of work on light weight paper, are equally serviceable when the machine is operating on container board.



DRIVE END AND FRONT VIEW CAMACHINE-18

CAMACHINE-18 requires no tinkering, special adjustment, or pampering. **To change from one width of strip to another** means only to loosen a thumb screw, slide the cutter to the new position, and tighten the screw. **To change from one weight of paper to another** requires no change except a turn or two of a hand wheel to the right or left to increase or diminish the tension on web, and maybe a turn or two on the wheel controlling the pressure on the cutters.

The use of "Coil Separating Grooves" on the Front Drum is a definite achievement in rewinding methods both as to separation of rewound coils and as to improving the surface of the web. This is also a "Cameron Principle."

CAMACHINE-18 is fool-proof and safe. A man can operate it year in and year out and still have ten fingers left and at least as much religion as he started with. The speed of operation depends solely on the requirements of the mill; two thousand feet travel per minute is practicable if desired. A 60" diameter of rewound roll is provided for if specially requested; otherwise, 42" maximum diameter.

Correspondence is solicited permitting the company to give definite details and proposal covering definite requirements.

A visit to the company's plant is also cordially desired, as machines finished or in the course of construction show many interesting points to the practical mill man.

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because they know these units accomplish results. In this large mill in Wisconsin, the one triple effect has been in operation for fifteen years.

The second unit was added because of the satisfactory service, the durable construction, the ease of operation, and the low costs of production of the first installation.

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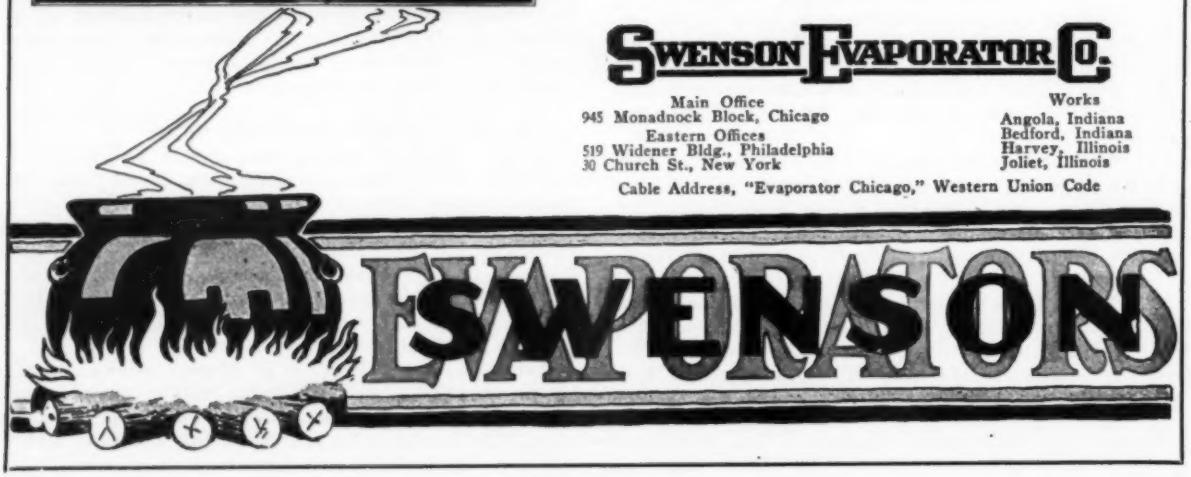


Progress on National Forestry Program

THE hearing given the National Forestry program by the House of Representatives Committee on Agriculture, January 26-27, resulted in a definite clarification of the measures proposed by the Snell bill (H. R. 15327) through the presentation of briefs involving not only individual sections of the bill, but presentations relating to the broad public interest.

Owing to the fact that Gifford Pinchot, former U. S. forester, appeared to oppose the bill, the time assigned to the proponents of the Snell bill was so limited that most of those who had come from a distance, such as two representatives of the Union League club of Chicago, and the representative of the American Newspaper Publishers' Association of Cleveland were not given an opportunity to appear in person.

Allegations made by Mr. Pinchot that the bill was designed to promote a monopoly of timber, and references to his own past relations with lumbermen, in which he said he had been led to favor improper measures, drew the replies of Col. Graves, former forester, and Col. Greeley, present forester, with declarations that the policy proposed by the Snell bill was originated under Col. Graves and perfected and formulated under Col. Greeley's administration, and that the Forest Service had not been used by lumber interests; the statements concluded with the declaration that the Forest Service, believing in the policies proposed, had welcomed support from whatever quarter it might come. Attention was called to the fact that some prominent figures in the lumber industry were opposed to the policy as advocated.

The hearing opened Wednesday, January 25, with a prefatory statement by Congressman Snell, in which he rehearsed the great and varied support accorded the measure. He was followed by Col. Greeley, who defined the policy proposed by Sections 1 and 2, as providing co-operation between states and private owners, under federal leadership. E. T. Allen, representing the Western Forestry and Conservation Association, followed with a declaration that as also representing the National Lumber Manufacturers' Association, he asked that the lumberman be accepted as an ally in the effort to provide for future forest crops, and not be considered as an enemy.

He was questioned by several congressmen, notably Congressman Voigt, as to his representation of lumber interests in Washington. In effect he declared that he had no salary except a salary from the Western Forestry Association, and that his chief work in Washington in the last few years had been when called by the War Industries board, the Internal Revenue bureau and similar agencies, to act as a neutral expert in matters affecting timber. He demanded to be shown any charge in the Federal Trade Commission report that he had received large sums for representing lumbermen, and the challenge was not answered.

Alfred Gaskill, state forester of New Jersey, representing the state foresters of twenty-two states, declared the reasons why the states favor federal leadership, but state control.

Mr. Pinchot's attack on the lumber industry, and his reflections upon the Forest Service followed, and closed the forenoon. The congressional committee then granted the proponents of the legislation additional time on Thursday to complete the presentation of arguments, but the time granted finally narrowed down to thirty minutes, and most of this was taken up by the statements of Cols. Graves and Greeley in defense of the Forest Service position, and Col. Greeley said that in his belief the growing of trees for future crops was not only the object of the legislation, rather than the determination of the distribution of present supplies, but added that this widespread growing of forests would be the most effective preventative of monopoly.

R. S. Kellogg, chairman of the Forestry Program Committee, presented the statements the second day in the absence of Mr. Snell, and added his statement as to the history of the legislation, declaring it was backed alike by manufacturers, converters and consumers of forest products.

Written statements were presented as follows:

R. S. Kellogg, on Sections 3-4.

E. E. Parsonage, president of the Association of Wood Using Industries, of Moline, Ill., on Section 5.

E. E. Carter, U. S. Forest Service, on Section 6.

W. L. Hall, Union League Club, Chicago, Sections 7-8.

Philip W. Ayres, Boston, in behalf of Society for Protection New Hampshire Forests and Massachusetts Forestry Association, also on Sections 7-8.

A. A. Sherman, associate forester, U. S. Forest Service, Section 9.

L. F. Kneipp, U. S. Forest Service, Sections 10-12.

Elbert H. Baker, chairman of Committee on National Forest Resources, of the American Newspaper Publishers' Association, publisher of the Cleveland, O., Plain Dealer, in general support of the bill, not alone selfishly, but from the standpoint of the public as well as of the newspaper publishers.

D. L. Goodwillie, Union League Club, Chicago, Michigan Manufacturers' Association, National Association of Box Manufacturers, like Mr. Baker, in general approval, as representing the public interest.

George W. Sisson, Jr., of Potsdam, N. Y., president of the American Paper and Pulp Association, from the same viewpoint, of the public as well as from the standpoint of the needs of that industry.

J. Randall Williams, Jr., National Wholesale Lumber Dealers' Association, in a similar vein.

Charles Lathrop Pack, president of the American Forestry Association, appearing for the broad public, as evidenced in the membership of that association.

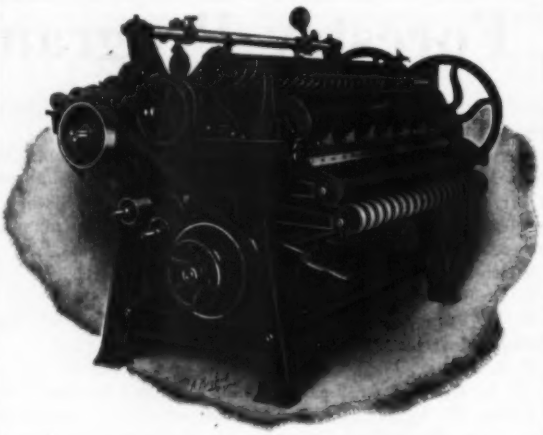
Statements of resolutions by endorsing commercial and civic organizations were also presented.

Conferences Arranged to Encourage State Legislation

With the campaign for the enactment of a national forestry program handsomely under way, the next step is being taken in the Middle West, with the organization of a confederation of state to take up state policies to conform to the proposed national policy as outlined in the Snell bill. This is one of the most important developments to be noted, for it means that the states are already waking up to their responsibilities as to their own forest lands.

Plans for this conference were made on February 12th by the Forestry Committee of the Union League Club of Chicago, which is to be the host for this conference. Sub-committees have been appointed, and D. L. Goodwillie, who represented the Union League Club at the Washington hearings, was made chairman.

The states involved are Illinois, Michigan, Minnesota, Indiana, Ohio, Iowa and Missouri. The club has asked the governors to attend and to bring along their forestry or conservation officials. The purpose of this noon luncheon-conference, on February 24th, is to plan the steps necessary to put under way substantial programs of forestry in the North Central states. It is possible that a permanent conference may be formed, with two special purposes, first, to encourage forestry education, organization and legislation in the several states and, secondly, to push the program of the National Forestry Program Committee.



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Single, Duplex, and Diagonal

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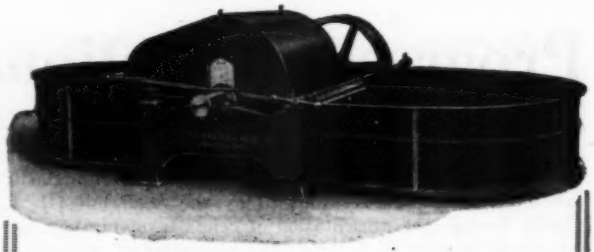

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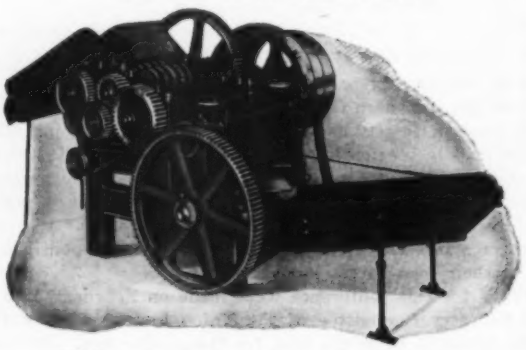
Beating Engines
are Built
for
Heavy Duty

Dayton Beater and Hoist Co.
DAYTON, OHIO

Improved Rag Cutter

"Cuts the Stock Both Ways"



This rag cutter is a glutton for work, and we believe will do double the work of an ordinary cutter.
Especially adapted for mills using high grade stock.
Write us and we will be pleased to tell you more about them.

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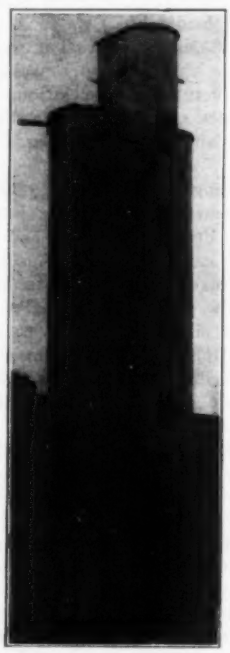

JENSSEN ACID TOWERS
at Nekoosa Edwards Paper Co.
Port Edwards, Wisconsin

62 Jenssen Tower Installations

GREAT ECONOMY has been effected in mills where the

JENSSEN Two-Tower Acid Systems

have been installed

Sixty-two Installations now in operation or building

U. S. A., Canadian and European Patents

G. D. Jenssen Co.
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Early steps to carry out the idea of this interstate conference have already been taken by some of the states involved; Wisconsin has already a program proposed, and plans are being made for a state conference in March. Ohio has forestry bills in the legislature now, and is urging their passage.

Many Public Meetings

The conference in the middle west will involve a series of public meetings, to be addressed by Col. Greeley, Col. Graves and R. S. Kellogg, chairman of this committee. Col. Greeley, in addition to his Chicago program of two days of discussion, goes to the City Club at Milwaukee the evening of February 23. New England heard Col. Greeley during the week of February 14th. His program included addresses by official invitation before the Massachusetts and New Hampshire legislatures. This was included with his attendance at the twentieth anniversary of the Society for Protection New Hampshire Forests, its meetings being at Boston and Concord, February 16 and 17. It was through this society's efforts, largely, that Col. Greeley was invited to address the two state legislatures. Philip W. Ayres, of the New Hampshire society, is a member of the National Forestry Program Committee.

Dr. Hugh P. Baker, also of this committee, spoke at the Milwaukee Rotary Club, February 15, and other meetings to be addressed by him and Mr. Kellogg during their visit to Wisconsin are probable.

Referendum Committee Named

Word from Washington is that, in reply to the request of many member organizations, the Chamber of Commerce of the United States has named a committee to investigate the forest problem and report at the March meeting of the directors. This is the usual course prefatory to the taking of such a referendum.

Some of the additional endorsements of the Snell bill are those of the California Forest Protective Association, and the Ohio Forestry Association. The latter organization is taking up the endorsement of the bill with Ohio representatives in Congress. Letters from various friends of the program indicate that this is being generally done.

No legislation can be secured unless Congress realizes the tremendous growth of forestry sentiment in the nation, and the general demand for protection of this national resource.

Women's clubs are becoming interested, and the forest program will be discussed this month by the Illinois Federation. The New York City Federation is discussing the problem in some of its committees.

Publications

The transcripts of the testimony on the Snell bill at the hearing January 26-27 will soon be available in limited quantities. This transcript promises to be the Forester's Handbook on policy. The committee is preparing a new circular, a six-page folder, resembling the Green Tree Circular, under the title "Forest Facts," which will be a condensation of statistics and data presented at the various forestery measure hearings. This will be available in quantities, and those interested should notify the secretary early of the number desired.

It is of interest to note that the American Newspaper Publishers' Association is distributing the text of Mr. Baker's argument for the Snell bill in behalf of the publishers.

Pending Legislation

Press dispatches say that the house committee on appropriations has recommended and the house passed items of $1,000,000 for land purchases under the Weeks law, and $125,000 for fire prevention. The same reports indicate that Mr. Haugen, chairman of the agricultural committee, from which forestry legislation must come, failed to successfully press points of order against some forestry items.

A circular from the National Forest Fire Prevention Committee, which through its secretary, Harris A. Reynolds, is in close co-operation with the National Forestry Program Committee, says that the Senate has raised the fire item to $625,000.

This is in line with this committee's fight for adequate fire prevention, and every pressure possible should be brought to bear upon Congress to show that an item of $625,000 a year to prevent fires costing $25,000,000 annually is none too small.

Paper Manufacturers Petition for Tariff Regulation

That news print paper should continue to come in from Canada free of duty was advocated by both American paper manufacturers and newspaper publishers February 5th before the house ways and means committee.

The position of the manufacturers was set forth in a statement presented by Henry W. Stokes of Philadelphia and others on behalf of the American Paper and Pulp Association. It was contended that the difference in cost of production of news print paper in this country and Canada justifies a tariff of three-quarters of a cent a pound, or $15 a ton.

It was stated, however, that inasmuch as 40 per cent of the news print paper used in the United States is brought from Canada, it is in the public interest that such a duty, if imposed, should be suspended in the case of news print importations from Canada and applied only by executive order whenever it may be shown that the Canadian provinces are maintaining or imposing restrictions that are inequitable or unfair.

The American Paper and Pulp Association asked that a duty be imposed on wood pulp which is admitted free of duty. A rate of one-tenth of 1 cent per pound was asked for mechanical pulp, a rate of two-tenths of 1 cent per pound on unbleached chemical pulp, and a rate of three-tenths of 1 cent per pound on bleached chemical pulp.

The reason given for suggesting these duties was that the manufacturers of pulp in the United States are at a disadvantage as compared with manufacturers in Canada and in Scandinavian countries, both in the matter of the cost of raw materials and the cost of labor.

Opposed to a Heavy Pulp Tariff

An appeal to the paper industry for support against "prohibitive tariff" legislation on imported chemical wood pulp, has been issued by the American Wood Pulp Importers' Association. It is pointed out the duty would have to be absorbed by the trade, the importer not being in a position to absorb it, and that many American mills are largely dependent upon Canada and Europe for their supply of raw materials, especially bleached sulphite and ground wood, as well as unbleached sulphite and kraft pulp.

"We appreciate that the government expects, and should receive sufficient revenue for its requirements, but you as a manufacturer, must determine whether that revenue should be exacted from raw materials or finished product, or both.

"If a duty is imposed upon European pulp, the same duty will naturally be applied to importations from Canada owing to the "Most Favored Nations Clause," existent in our treaties with all foreign powers.

"At the same time it is important if a duty is placed on imported pulp, to urge upon your representative in Congress that such duty should be on a specific basis rather than ad valorem, so as to avoid confusion and conflict in figuring the duty."

THE
MANAGEMENT ENGINEERING AND DEVELOPMENT CO.
7TH FLOOR CITY NATIONAL BANK BLDG.,
DAYTON, OHIO.

DESIGN, CONSTRUCTION AND OPERATION
OF
PULP, PAPER AND FIBRE MILLS
WATERPOWER DEVELOPMENT
STEAM POWER PLANTS.

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Engineer
Paper, Pulp and Box Board Mills
We number among our clients some of the leading factors of the industry, and are prepared to render the character of service you will appreciate.
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CONSULTATIONS —— REPORTS —— ESTIMATES
Complete Designs Pulp and Paper Mills
Steam and Electric Power Plants. Equipments
6th Floor, Kirby Building CLEVELAND, OHIO

James L. Carey
Paper Mill Architect and Engineer
208 N. Laramie Ave., Chicago, Ill.

STEBBINS ENGINEERING & MANUFACTURING CO.
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Special Sulphite Mill Equipping
Agents for the Heiskanen Pulp Bleaching Apparatus.

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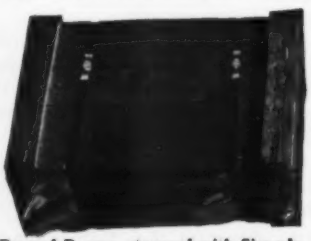
Framed Reams, strapped with Signode System
Signode straps insure delivery of framed paper bundles in the same condition they leave the mill. Cheaper than rope. No battered corners. Liberal trial arrangement.
Write for Particulars and Prices
The Signode System, Inc.
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The CHICAGO Approved Portable WATCHMAN'S CLOCK
with its special Waltham movement, its lock stations and its superior quality throughout, is especially desirable for mills and factories and for either in-door or out-door patrol.
Write for booklet.
CHICAGO WATCHMAN'S CLOCK WORKS
9 Church Street, NEW YORK
1528 South Wabash Avenue, CHICAGO

Ordered to Readjust Paper Freight Rates

Rate advantages enjoyed by paper mills of the Fox river valley over Michigan mills on printing paper, book and waxed wrapping paper shipments to Illinois points, were removed through a ruling by the interstate commerce commission ordering Wisconsin and Michigan railroads to readjust their rates.

The commission found upon complaint of shippers at Kalamazoo, Otsego, Plainwell, Vicksburg, Watervliet and White Pigeon, Mich., that the freight rates to Joliet and Aurora, Ill., were unduly prejudicial and preferential to shippers in Appleton, Neenah, Menasha, Kimberly, Kaukauna, Combined Locks and Green Bay. There was a wide divergence in rates charged to the Illinois points from the two states, it was charged.

Defendant roads were ordered by the commission to establish equitable rates before April 22.

The Michigan mills in a previous complaint alleged that carload rates from their mills to Chicago and Milwaukee were unduly prejudicial compared with rates to the same destination from paper mills in the Fox river valley and elsewhere in Wisconsin. The commission dismissed part of the complaint because the kind of paper manufactured was not similar.

Laboratory Section Chief Goes to Panama for United Fruit Company

P. V. Siggers, who for the past eleven months has been in charge of the Section of Pathology at the Forest Products Laboratory of the United States Forest Service, leaves Thursday for Panama, where he will be engaged in plant disease work for the United Fruit company.

Mr. Siggers has been connected with the Bureau of Plant Industry since June, 1916, except for 20 months while with the Engineer Corps in France. The Bureau of Plant Industry maintains a co-operative office with the Forest Products Laboratory in pathological work, and Mr. Siggers has been stationed in Madison on this work.

The new work that he is entering will involve principally a study of the diseases of the cacao and cocoanut. These products are handled commercially by the United Fruit company, which owns large plantations and a steamer line to the West Indies and South America.

A farewell supper in honor of Mr. Siggers was given recently in the laboratory by the men and women who have been working with him. Dr. R. H. Colley acting as toastmaster.

Kress of Forest Products Laboratory Joins Staff of Consolidated Paper Company

Otto Kress, for the past four years in charge of the pulp and paper work of the Forest Products Laboratory of the United States Forest Service, leaves January 25 to join the staff of the Consolidated Water Power and Paper company of Wisconsin Rapids, Wis. This company operates four mills having a combined capacity in excess of 200 tons daily on newsprint, mitscherlich, ground wood and sulphite pulp. He will be engaged with technical problems in connection with the control and development of pulp and paper products.

Doctor Kress has been in charge of the pulp and paper research at the Forest Products Laboratory since September, 1915, except for a year during the war when he was with the E. I. Du Pont de Nemours Co. in Wilmington, Del., engaged in dye research work. After taking a degree as doctor of philosophy in chemistry at Columbia university, in 1909, Dr. Kress was engaged in pulp and paper mill work with various companies, joining the Bachische company of New York City in 1912, as dye and paper mill expert, where he remained until he took charge of the work at the Forest Products Laboratory.

During the time Dr. Kress has been associated with the Forest Products Laboratory, his department has more than doubled in size, and much important work has been accomplished for the pulp and paper industry. The demand for research work for mills and associations has grown until it is greater than the laboratory can handle with its present appropriation. Among some of the valuable researches carried forward during this time are studies of the suitability of all American woods for pulp and paper, the fundamental

Otto Kress

cooking condition of chemical pulping processes, the development and use of cotton linters for pulp and paper, and a far-reaching study of the cause and prevention of decay in wood and wood pulp. The laboratory has worked in close co-operation with the industry in these studies and the industry financed many of them by supplying men or money.

Dr. Kress is a member of various chemical societies, and was one of the founders of the Technical Association of the American Pulp and Paper association; he is also an honorary member of the Superintendents' association of the same organization. He has been active in committee work of industrial associations, and has presented not less than 40 scientific papers and research reports before various organizations during the last four years.

Dr. Kress is such a type of man that it is a joy and inspiration to meet and talk with him. His services at the Forest Products Laboratory have been invaluable to the industry. Here is wishing you good luck in your new work.

Arthur Simon, formerly with the Harris Paper Company and more recently sales manager of the Majestic Mills Paper Company, both of New York, has become associated with David L. Engel, paper merchant of 10 West Twenty-second street, New York, in an executive capacity as well as manager of sales. Mr. Engel specializes in writing papers and envelopes.

The White Tar Aniline Corporation

56 Vesey St., New York — Works, Kearny, N. J.

WHITAR NEWS BLUE

Highest Concentration
Ask for Samples and Prices

Colored papers (or samples of dyestuffs)
matched and complete formulas furnished

New England Representatives: UNION CHEMICAL CO., Boston, Mass.

Even In China
Clean Boilers Mean Greater Profits

Who thinks of China—the "unmoved and unmoving"—in terms of fuel and labor saving devices?

Thus to tradition ancient Cathay reverencing the customs of the past should calmly ignore the methods and implements of twentieth century "efficiency."

But there is a new spirit in the Oldest of Empires. Machines are replacing hands. Here and there an industrial center is springing up.

And mark you —!

China's manufacturing plants of 1921 are equipped with the best obtainable modern high-speed, high efficiency machinery.

Take Diamond Soot Blowers for example. The installation shown on this page, that of the Yufoong Cotton Mills at Chengchow, Honan Province, is only one of twenty or more installations made during the past year.

With the cheapest labor in the world—China is eliminating hand cleaning of boilers. With vast untouched supplies of coal and oil, China is saving fuel through the use of Diamond Soot Blowers.

Even in China clean boilers mean greater profits!

Here, then, is a striking lesson which can well be scanned by every American business man. If Diamond Soot Blowers are a profitable investment in such a land as China, how much more essential and profitable must they be in the United States today?

If your boilers are not equipped with Diamond Soot Blowers and you want to save fuel and labor, write for Bulletin 290.

DIAMOND POWER SPECIALTY COMPANY
Detroit, Michigan

Diamond
SOOT BLOWERS - SAVE 4 to 8% FUEL

News Miscellany

The Technical Association Prepares for Annual Meeting

The executive committee of the Technical Association of the Pulp and Paper Industry met in New York recently, and completed preliminary arrangements for the annual meeting and banquet of the association, which is to be held in conjunction with the annual meeting of the American Paper and Pulp Association at the Waldorf-Astoria and the Hotel Astor, New York, during the week of April 11 to 14, 1921.

The convention will open with informal meetings of the executive committee and the chairmen of standing committees on Monday, April 11, while the first general session of the association will convene in one of the large meeting rooms of the Waldorf-Astoria at 10:00 o'clock a. m., Tuesday, April 12. There will be the usual welcoming address, followed by the address of the president, reports of standing committees and nominations for officers to serve during the ensuing year. The second general session in the afternoon will be devoted to the reading and discussion of scientific papers.

On the evening of Tuesday, April 12, at the Hotel Astor, the annual banquet will be given, at which Judge Charles F. Moore will be toastmaster. An attendance of between four and five hundred is looked for at the banquet. Seats at tables will be assigned to suit the wishes of members, who have the privilege of inviting guests. Reservation blanks will be mailed to members with the formal notice of meeting, and the secretary hopes that applications for table reservations will be made promptly on receipt of the application forms. Reservations for the banquet of the main association can also be made by members of T. A. P. P. I., who are all eligible to attend.

The third general session of the annual convention of T. A. P. P. I., on Wednesday, will feature symposiums on Pulverized Fuel and Steam Economy, conducted by Howard S. Taylor, chairman of the committee on heat, light and power; and New Methods of Grinding Wood, conducted by the committee on ground wood, of which W. A. Munro is chairman. Other symposiums, discussions and special papers for Wednesday and Thursday afternoon will be announced later.

Thursday morning will be reserved for the annual meeting of the American Paper and Pulp Association, which will be attended by the Technical Association in a body.

A new volume of *Technical Association Papers* has been published and mailed to members from the secretary's office. It contains a revised and enlarged paper on tests for unbleached sulphite and sulphate fibers, in addition to the special papers and addresses presented before the Technical Association at the Fall meeting, in Saratoga Springs, N. Y., last September. The working principle of the mercury-vapor boiler invented by William Leroy Emmet, of the General Electric company, is described in the new volume in concise and comprehensive terms, an outline sketch of the apparatus being included. The volume contains a list of the officers and committees of T. A. P. P. I., as well as a directory of members, and the text of the constitution and by-laws. Copies of the volume are on sale to non-members at the secretary's office, 542 Fifth avenue, New York, at $2 each.

The next series of *Technical Association Papers* to be published in May or June will contain a limited number of advertising pages, it having developed that several of the larger manufacturers of machinery and apparatus desire to make announcements through the official journal of the association. The advertising is to be restricted to descriptions of technical apparatus, machinery and materials used in pulp and paper mills that are calculated to be of interest and value to technical men in the industry. The executive committee has ruled that manufacturers of paper be not permitted to contract for advertising space in the association's journal.

The next fall meeting of the Technical Association will be held at Washington and Philadelphia. An invitation of the American Pulp and Paper Mills Superintendents' Association for a joint meeting with the Technical Association has been accepted, providing the meeting can be held in the latter part of September in conjunction with the regular Fall meeting of the Technical Association. The superintendents' association had expressed a desire to hold the joint meeting in the month of June, but there would be difficulty in getting the members of T. A. P. P. I. together within so short a period after the annual meeting in April.

T. A. P. P. I. was well represented at the annual meeting of the Technical Section of the Canadian Pulp and Paper Association, which was held in Montreal on Wednesday and Thursday, January 19 to 20, as 12 delegates was appointed, and all signified their intention of attending. The names of the delegates follow: R. B. Wolf, R. S. Kellogg, George E. Williamson, W. E. Dryon Baker, Grellet N. Collins, J. A. De Cew, Clark C. Heritage, Kenneth T. King, W. A. Munro, Howard S. Taylor, Ross Campbell, Arthur S. Cosler.

Among recent elections to membership in the Technical Association is that of Dr. Jessie E. Minor, at present head of the pulp and paper department of the Emerson Laboratory, Springfield, Mass. Miss Minor's application received the unanimous approval of the executive committee early in January, and she has taken her place as an active member with Miss Helen U. Kiely, associate chemist of the American Writing Paper company, these two being the only lady members of the association. Miss Minor holds the Doctor of Philosophy degree in chemistry from Bryn Mawr college and is a B. S. of Drury college.

The Technical Association of the Pulp and and Paper Industry is now working in splendid harmony with the American Paper and Pulp Association and sister associations. At the meeting of the executive committee recently a series of organization charts was exhibited, showing the relations of the affiliated associations to the American Paper and Pulp Association, and a resolution was adopted pledging the hearty support of the Technical Association to Dr. Hugh P. Baker, in his work as secretary of the American Paper and Pulp Association. The association is also co-operating with the Cost Association of the Paper Industry in the production of short, pithy accounts of manufacturing processes involved in the production of typical papers, beginning with the raw materials used and processes and machinery. This is to be done in connection with the decimal classification of papers and boards originating in the Department of Technical Control of the American Writing Paper company, in which ten types of paper and board are subdivided into seventy-two classes, which may be still further divided into one hundred and fifty-six known kinds of paper. An article will be published at an early date showing the possible use of such a classification scheme by manufacturers.

Copies of *Technical Association Papers*, Series I and II, are wanted by the secretary of the Technical Association of the Pulp and Paper Industry, who will pay $2 each for copies in good condition delivered at the office of the association 542 Fifth avenue, New York.

Tentative Program of A. P. P. A. Convention

One of the biggest conventions ever held in the history of the paper industry is scheduled for April, according to a preliminary program issued by Dr. Hugh P. Baker, secretary-treasurer of the American Paper and Pulp Association,

Manufacturers of

Paper Cores, Paper Twine

and

Mill Wrappers

for Paper Mill use

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Distributors of

Boards, Coarse Wrappings

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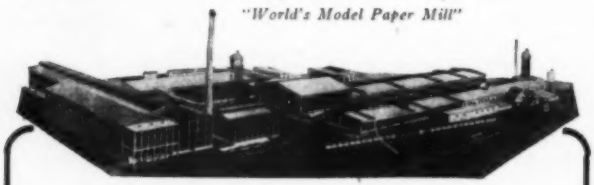
"World's Model Paper Mill"



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Pure, Genuine Vegetable Parchment
Waxed Paper, plain or printed
Bond Paper, white or in colors
Blood-proof Meat Paper

These four grades of paper made in our Mill by contented, conscientious and skilled folks.

Both jobber and customer will be satisfied; they get their money's worth in the purchase of KVP brands.

Quick Delivery—any quantity. Ask for Samples.

Kalamazoo Vegetable Parchment Company

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FOR SALE

In Good Operating Condition
For Immediate Delivery

4 Beaters, Noble & Wood, 72″x44″ wood tub.

1 Beater, Dilts, 62″x50″ with iron tub.

1 Stack Machine Calender, 112″ face. 10 rolls, bottom 20″ diam., 1-14″, 7-9″, top 14″. Equipped with box cored frame, rolls removable through side. Doctors, Levers and Weights, complete with Marshall Drive, self-contained 7″ Mortise gear and friction clutch pulley. Rolls recently reground.

18 Dryers, 48″x68″ face.

10 12 Plate openside Packer Screens.

Frank H. Davis Company

175 Richdale Ave. Cambridge 40, Mass.

particularly in the number of associations which will hold their conventions at this time.

The plans for the meetings of the parent organization are particularly elaborate, and involve some notable speakers on general economic subjects, if present negotiations are successful.

The tentative program follows:

Monday, April 11.
Toilet Paper Converters' Association—10 A. M.
Tissue Paper Manufacturers' Association—2 P. M.
Paper Makers' Advertising Club—1 P. M.

Tuesday, April 12.
Book Paper Manufacturers' Association—10 A. M.
Cover Paper Manufacturers' Association—2:30 P. M.
Pulp Manufacturers' Association—2:30 P. M.
Salesmen's Association of the Paper Industry—10 A. M.

Wednesday, April 13.
Writing Paper Manufacturers' Association—10 A. M.
Sulphite Bond Division—2:30 P. M.
Cardboard Manufacturers' Association—10 A. M.
Wrapping Paper Manufacturers' Association—10:30 A. M.

Thursday, April 14.
American Paper and Pulp Association—10 A. M.
Binders Board Association—4 P. M.
All of the sessions will be held at the Waldorf-Astoria.

National Paper Trade Association Appoints Committees

The coarse paper division of the National Paper Trade Association has appointed the following committees on mill relations:

Tissues—A. W. Sielaff, of the A. E. Sielaff Paper Company, Milwaukee, chairman; F. A. O'Neill, of the Paper Manufacturers Company, Philadelphia, and Robert M. Stone, of the Stone & Forsyth Company, Boston.

Bags—J. G. Swift, of W. H. Clafin & Company, chairman; H. J. Severance, of the Hubbs & Howe Company, Buffalo, and Walter Seinsheimer, of the Seinsheimer Paper Company, Cincinnati.

Wrappings—A. M. Rosenthal, of the Standard Paper Company, Indianapolis, chairman; Frank W. Power, of Carter, Rice & Company, Boston, and Fred L. McClellan, of the McClellan Paper Company, Minneapolis.

M. Gottesman & Company, wood pulp importers of 18 East Forty-first street, New York, have increased their capital from $650,000 to $1,000,000.

Wisconsin Local Division of the Cost Association of the Paper Industry

The meeting of the Wisconsin Local Division Cost Association of Paper Industry, held at Wausau, Wis., on January 20, 1921, was one of the most successful meetings ever held by the Wisconsin Local. The attendance was large. The main topic for discussion as previously announced, was the Beater Room, its various Cost Problems and the method pursued by the mill to be discussed by its representative.

All the representative mills came fully prepared with several complete sets of blank cost forms, and these were handed to the members present, which made it easier for the speaker to explain just how his mill got the necessary information pertaining to cost from its beater room department.

Aside from the regular routine of business this meeting was termed the First Annual Meeting, and officers for the coming year were elected as follows:

President, A. M. Van Douser, Marathon Paper Mills, Rothschild, Wis.; secretary-treasurer, F. P. Vaughan, Fort Howard Paper Co., Green Bay, Wis.; Committee—R. H. Lewandowski, Menasha Printing & Carton Co., Menasha, Wis.; C. A. Jasperson, Mekoosa-Edwards Paper Co., Port Edwards, Wis.; P. V. Millars, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.

The next meeting is to be held at Neenah, Wis., March 24, 1921, and the main topic for discussion will be, "The Machine Room" and every phase pertaining to the distribution and finding of machine room cost.

The following mills had representatives at this meeting:

Bergstrom Paper Co., Neenah, Wis.; Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; Falls Manufacturing Co., Oconto Falls, Wis.; Fort Howard Paper Co., Green Bay, Wis.; Marathon Paper Mills Co., Rothschild, Wis.; Marinette & Menominee Paper Co., Marinette, Wis.; Menasha Printing & Carton Co., Menasha, Wis.; Nekoosa Edwards Paper Co., Port Edwards, Wis.; Pride Pulp & Paper Co., Tomahawk, Wis.; Shattuck & Babcock Co., Div. American Writing Paper Co., De Pere, Wis.; Whiting Plover Paper Co., Stevens Point, Wis.

First Meeting of the Cellulose Section American Chemical Society

At the Cellulose Symposium held by the Industrial Division of the American Chemical Society at the meeting in Chicago last September, it was voted to form a permanent Cellulose Section. Following the meeting the necessary steps for organization were taken, and President Noyes appointed Professor Harold Hibbert, of Yale University, chairman of the new section, with Gustavus J. Esselen, Jr., secretary. One of the objects of the section is to provide an opportunity for those interested in the practical application of cellulose to get together with those concerned with the more strictly scientific aspects of cellulose chemistry and to afford an opportunity for discussion which should prove mutually helpful.

An interesting program is being arranged for the first meeting of the new section in connection with the meeting of the American Chemical Society in Rochester, New York, beginning April 26th. Those having papers which they would like to present before the section are requested to send title and abstract before April first to the secretary, who may be addressed care Arthur D. Little, Inc., 30 Charles River Road, Cambridge, 39, Massachusetts.

Notes of Western Canada

The announcement has been made by U. M. Waite, vice-president of the Reliance Mill and Trading company, New York, which is taking over the operations of the Whalen Pulp and Paper Co. in British Columbia, that S. H. Garrigan has been appointed manager in charge of the company's interests occupying relatively the same position as was held by Sir George Bury, who resigned from service of the Whalen Co. several months ago. The other new appointment which has been made is that of N. J. Foley as superintendent of the plant at Port Alice. The post of superintendent of the Swanson Bay plant has yet to be filled.

Mr. Garrigan will have charge of the supervision of every department except that of the treasury.

The new manager is no novice at the pulp and paper trade, having entered the sulphite manufacturing business at the age of 15.

Several important changes in the executives of the Western Canadan Pulp and Paper company have been announced. One of the most interesting is the appointment of Henning Helin as general manager of the company's affairs in British Columbia.

Another change announced is the selection of H. J. Daly, as president of the company, to succeed E. M. Davis, whose retirement from that office has been rendered necessary for business reasons. Mr. Daly is also president of the Home Bank of Canada.

Mr. Henning Helin, the general manager, is well known in industrial circles throughout the Dominion, having been for six years technical manager of the Wayagamack Pulp and

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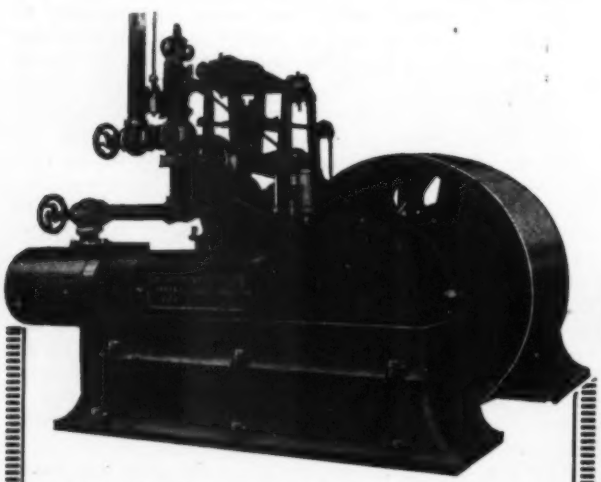

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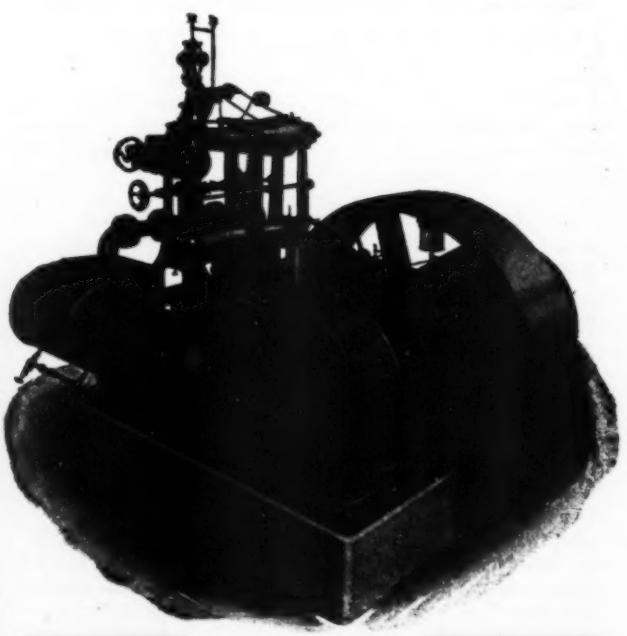

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Paper company before going west. For ten years he was engaged in the practical end of the manufacture of pulp and paper in Sweden, and is a graduate of one of the largest technical colleges in that country.

The plant of the Western Canada Pulp and Paper company will be put into operation early next month.

Want Boundary Line Controversy Settled

Recent reports which come from Labrador, say that the recent surveys which have disclosed immense resources of timber suitable for pulp and paper manufacture, have led to a revival of efforts to bring about a determination of the boundary line between Newfoundland and the Canadian province of Quebec. This line has never been laid down by actual survey, and its various definitions as given in documents issued at intervals in the last century and a half are so vague that government officials do not know just how much of Labrador belongs to Newfoundland and how much to Canada.

That Labrador is rich in many natural resources, including enormous water power, has long been known, but the practicability of utilizing its forests for paper-making was not demonstrated until the world-wide paper shortage led to exhaustive investigations of the territory. This resulted in applications by promoters to the Newfoundland government for timber limits in Labrador. As these could not be acted upon until it was determined whether Newfoundland owned the land in question, representatives were sent to London late in the summer to discuss with eminent English counsel the preparation of a formal draft of Newfoundland's Labrador claims as opposed to those of Canada.

The provincial register of companies at Victoria, B. C., announces that the Prince Rupert Pulp and Paper Company, Ltd., with a capitalization of $4,000,000, had been incorporated with the object of manufacturing paper on a large scale in Northern British Columbia.

Crown-Willamette to Reforest

The Crown-Willamette Paper Company will undertake the coming spring to begin the work of reforesting some of the areas of country that they have logged off in Clatsop County, Oregon. They expect to begin the work on the Necanicum below Seaside. Spruce and hemlock are the varieties of timber that will be used.

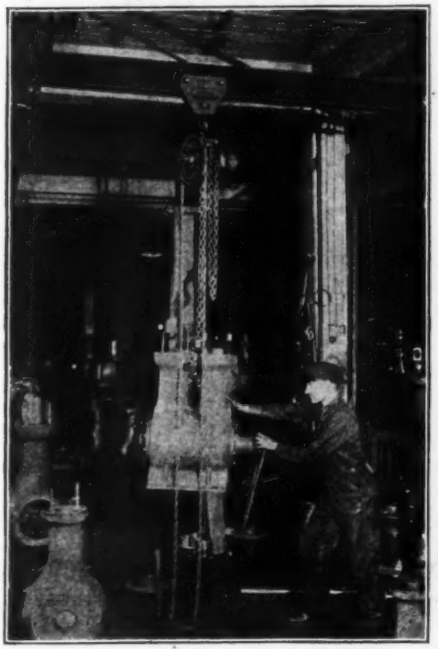
Only the roughest country that will not be suitable for any other purpose will be reforested. In reforesting they figure that it will take 50 years to bring spruce and hemlock up to its maximum. These two grow very fast up to the 50-year period. After that time the growth is very slow. It is profitable to begin to cut this timber after 25 years.

On some of the ground cut over already nature has started to do its work, and all that will have to be done is to fill in the places where it has not voluntarily seeded. It is their intention to establish a nursery for these two species of trees and it is their intention to work in connection with the United States forestry service. The success of reforestation will depend upon low assessment of this particular class of land.

Several years ago the Crown-Willamette company started the work of reforestation in the Willamette valley. The ground was seeded to cottonwood, but the value of the land was such that the taxes upon it made it prohibitive to carry it through. It is not the company's intention to reforest any of the lands that could be converted more profitably to agricultural purposes.

The paper industry is growing in the Pacific northwest territory. The Spokane, Wash., branch of the Zellerbach Paper Co., reports a 300 per cent increase in their sales in 1920 over any previous year.

YALE



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Low in Cost
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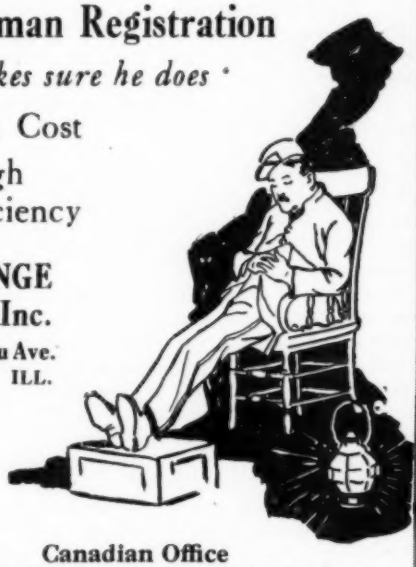

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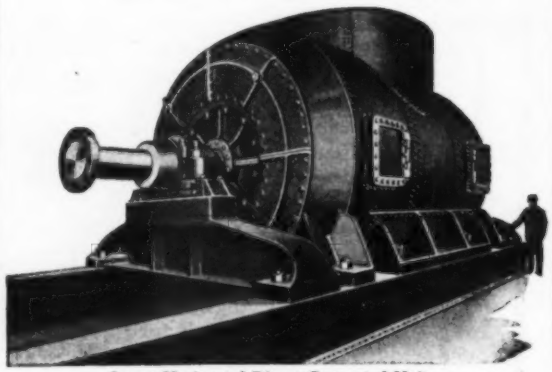

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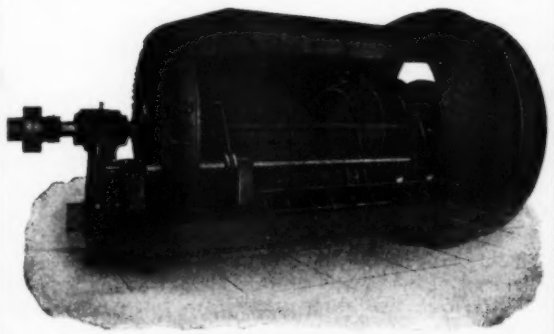

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B. J. McBain Resigns from Crown Willamette

B. T. McBain, for the past 15 years a resident of Oregon and connected with the management and operation of the mills of Crown Willamette Paper Co. in the states of Oregon and Washington, surprised his many friends a few days ago by announcing his resignation from that company's employ.

He came to Oregon in 1906 after 12 years in the San Francisco business and sales offices of the Willamette Pulp and Paper Co. and for a few years acted as assistant to Mr. Norman R. Lang, then managing director of that company. In 1911, when Mr. Lang accepted the position of managing director of Powell River Co., Ltd., at Vancouver, B. C., Mr. McBain was promoted to succeed him at Oregon City. Under his management the mills here have prospered and he is a favorite among his men.

Since the Crown Willamette Paper Co. was incorporated, he has been associated with Mr. A. J. Lewthwaite at Portland, Ore., as assistant resident manager, though he continued to reside at Oregon City, only recently moving his family to the metropolis of Oregon.

He is now completing some matters started by him which he expects to have out of the way by March 1, when he plans on taking a rest before entering other employment.

He will not announce at this time what his new connection will be or whether he has as yet made one. His many friends look forward to the news of his landing on top somewhere where his well known ability as a leader and organizer in business as otherwise will count.

Additions Recommended for New Mill

The annual meeting of the Oregon Pulp and Paper Co., Salem, Oregon, was held on January 26, 1921, and the following officers were elected: F. W. Leadbetter, president; Charles K. Spaulding, vice-president; William S. Walton, treasurer, and Roy H. Mills, secretary. The directors who were re-elected were: Joseph Kaster, superintendent and manager, Walter L. Spaulding, Frank G. Andreas. Three more were added to the board who are E. S. Collins, of Portland, John McNary and Joseph Baker.

The construction of this plant started the first of July, 1919, it and was completed and put in operation about October first of last year, making it little over three months of operating. During the first month the operation was more or less of a warming up process getting the machinery to running properly and gradually bringing about an efficient operation. Nevertheless the trial balance proved very satisfactory to the directors of the enterprise.

Their output of high class finished papers now runs around 15 tons a day. But this is on the one machine and a second machine will be ready March 1st, after which the output will be very materially increased.

Mr. Leadbetter recommended the development of the company's North power, saying that the property is of great value to the mill. It has a two-thirds ownership in what is known as the Santiam power race, together with the millrace through the city. The ditch will develop from 800 to 1,000 horse power. He also recommended the purchase of a third machine for the plant.

Pulp and Paper Mill to Be Built

It is reported that there is to be a new paper mill built at Vancouver, Wash., by the Oregon-California Paper Mill interests on the site of the old Pittock-Ledbetter mill in that city.

It is said that the proposed pulp and paper mill may have a greater volume of production than the mills at Camas and Oregon City on account of the many advantages offered by the Vancouver site. The short distance between Vancouver and Portland and the proposed docking system for the accommodation of ocean-going vessels are believed to be factors in the selection of Vancouver as a location.

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1—75 K. W. Direct Connected Steam Unit, 60 cycle, 3 phase, 2200 volts, Ideal Tandem Compound Engine.

1—10 x 30 and 1—14 x 36 Corliss Engine.
A lot of boilers, pumps, etc.

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2—1800 lb. Brand New Beaters, never installed, Rolls 61"x48", immediate delivery. For detailed specifications and prices Address Box 1075, c/o The Paper Industry.

ENGINEER owning Spruce Areas on Seacoast of Newfoundland—sufficient supply for 100-ton mill, sixty years, water powers, Government concessions, full stumpage—seeks co-operation in development of Paper Mill. Reply Efficiency, c/o The Paper Industry.

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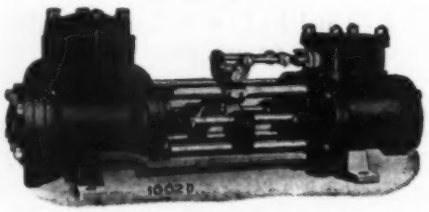
10 Noble and Wood Beaters—1800 pound—Rolls 72" x 44"—condition good. For further information apply The Stamsocott Company, Inc., Hopewell, Virginia.



When buying a pump it is well worth your time to make a careful selection and carefully compare the various features to be considered in choosing the proper pump for the service to be performed. We would like to be of assistance in advising the purchaser the vital points which we consider of importance in making a selection and feel our fifty years' practical experience should be of some value.

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WE wish to emphasize the word "automatic." This with us means that the steam follows changes that come to the sheet from free to hard drying stock or any ordinary changes in weights. A control that does not do this in itself is not automatic. This makes a better sheet of paper. We guarantee to hold the moisture at any point you wish with ½ of 1% change. Furnished on 60 days' approval.

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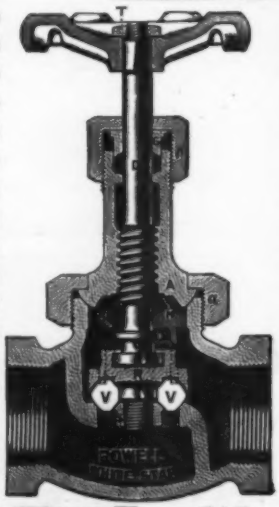

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When one side of the disc is worn out, turn it over, and after regrinding the seat you have a new valve.

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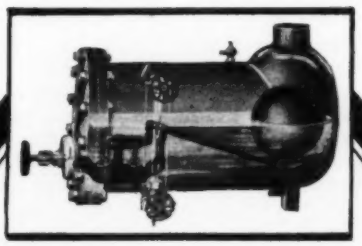

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New Factory to Make Wax Paper

The Pioneer Paper Company recently announced the completion and commencement of operation of its new third plant, located at Los Angeles, Calif., in which a new industry for this city in the manufacture of waxed paper or paraffined paper for commercial uses will be pushed on the basis of large-scale production.

The new plant, to be known as No. 2, consists of buildings for some time owned by the Pioneer company and held in reserve for the present development. These biuldings, with approximately 30,000 feet of floor space, have been entirely remodeled and modernized for the uses to which they have now been turned.

The new wax paper plant is the only one of its kind south of Portland and west of Kansas City; and, while the production of this first unit will be sufficient to supply the entire needs of Southern California, construction of a duplicate unit will go forward at once, enabling Los Angeles to supply the entire West with all the waxed papers it can consume.

The Pioneer Paper Company is a purely local concern, established in 1888 by Los Angeles men, and is entirely capitalized locally. Originally a jobbing house with a few specialty lines, it has grown with the Southwest, now owns and operates three large factories in Los Angeles, absorbs the entire output of a fourth factory, and nearly all of the output of a fifth. The company maintains a branch in San Francisco and has active agencies in every large city west of the Rocky Mountains.

Factory No. 1 of the Pioneer company produces roofing papers only. Factory No. 3 specializes in fruit wrappers and the new No. 2 plant in waxed papers. The officers of the company are: W. G. Hunt, president; H. M. Eichelberger, secretary and general manager.

Wisconsin Mills Hold Annual Meeting

Annual meetings of some of the Wisconsin mills report the following election of officers and directors:

Northern Paper Mills

Directors: W. P. Wagner, George D. Nau, W. T. Fogarty, Earl Murray, E. L. Wagner, P. S. Wagner and E. E. Brugh. The officers are: W. P. Wagner, president; W. T. Fogarty, vice-president; P. S. Wagner, treasurer and general manager; W. H. Brightman, secretary.

Consolidated Water Power and Paper Company

Officers: G. W. Mead, president; R. L. Kraus, vice-president; Isaac P. Witter, secretary. The directors are the officers and George P. Berkey and T. W. Brazeau.

Nekoosa-Edwards Paper Company

Directors: L. M. Alexander, Judson G. Rosebush, C. A. Jasperson, L. E. Nash, J. B. Nash, F. J. Wood and J. E. Alexander. Officers are: L. M. Alexander, president; J. G. Rosebush, vice-president; C. A. Jasperson, secretary.

Rhinelander Paper Company

Directors: A. W. Brown, W. E. Brown, Paul Browne, J. Segerstrom, M. H. Raymond, George W. Mason and Dr. A. D. Daniels. Officers were named as follows: President, A. W. Brown; vice-president, W. E. Brown; secretary, Paul Browne; treasurer and manager, H. C. Hanke.

Wausau Sulphate Fibre Company

Officers: F. P. Stone, president; O. A. Bache Wiig, vice-president and general manager; Louis Dessert, vice-president; G. D. Jones, secretary; A. L. Kreutzer, treasurer; J. P. Sill, assistant secretary and treasurer.

Wausau Paper Mills Company

Walter Alexander was re-elected president of the Wausau Paper Mills Company. Other officers are: C. C. Yawkey, vice-president; W. L. Edmonds, secretary, treasurer and general manager. Directors are: Mr. Alexander, Mr. Yawkey, Mr. Edmonds, F. C. Boyce and J. E. George.

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—A thirty-page book on boiler settings. True, it is about "Steel Mixture" boiler settings but you probably know about the usual small-brick settings and you certainly want to know about the modern method—everybody keeps in step with the times.

"STEEL MIXTURE"

is a large-block construction for the Front Linings, Fire Box, Combustion Chamber Arch, Blow-Off Pipe Covering and Furnace Arches.

IT IS CORRECTLY DESIGNED; Front Arch to permit easy and quick firing; Fire Box Linings to be air-tight and save coal; Back Arch to be strong and gas-tight, and leave work-room underneath.

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IT IS SHIPPED PROMPTLY from stock; Fitted up to the measurements of each individual setting. For all styles and sizes of boilers.

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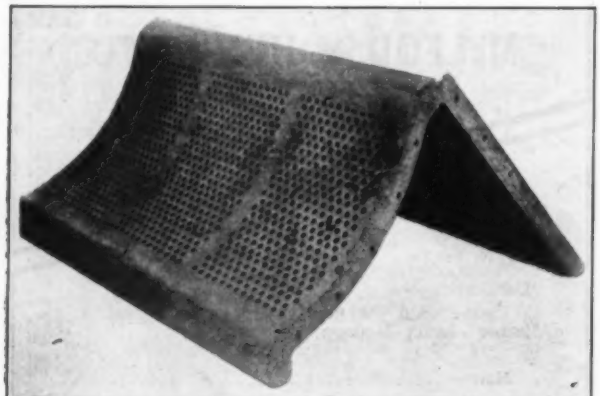
Intensive specialists in the manufacture of uniformly high grade machine knives for the pulp, paper and board industry



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

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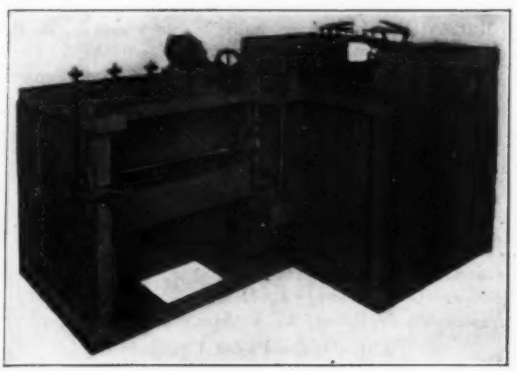

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1—Uniformity of product; saves power, labor, maintenance cost and floor space.

2—The use of the Trimbey & Allen Continuous Mixing System replaces the uncertain manual control of the proportions of the various paper making ingredients by an accurate mechanical control.

3—This means better running conditions on the machine and increased production of paper.

TRIMBEY & ALLEN
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Names Directors of Peshtigo Co.

At the annual meeting of the Peshtigo Pulp and Paper Co., Peshtigo, Wis., the following directors were reelected: John A. Kittell, Joseph P. Neugent, A. J. Tipler, Chas. W. Collier and Fred Miller, all of Green Bay; Nick Dohr, Appleton; John Eng, Sheboygan; M. F. Herb, Peshtigo; Adolph Splenger, Bonduel, and S. D. Woodward, Peshtigo. Frank Lauerman, Marinette, was elected to succeed Henry Merrick, of Green Bay, resigned.

The company has one paper machine in operation and is installing another, which will be one of the largest in this section of the state.

Pulp Mill Sold

The biggest realty transfer in 1921 in the Fox River valley was consummated recently when Lewis L. Alstead and A. J. McKay purphased the Kaukauna Pulp company's plant in Kaukauna, Wis. The new owners have taken possession of the property and will operate it. Extensive changes and improvements are contemplated.

Mr. McKay and Mr. Alstead are connected with the Combined Locks Paper Co., the Lakeside Paper Co. and several other large companies in Wisconsin. The Kaukauna plant will be operated by a new company to be known as the Valley Pulp Co., with L. L. Alstead as president; A. J. McKay as vice-president, and L. A. Lecker as secretary.

The pulp mill has been operated for several years as subsidary of the Kieckhefer Box Co. of Milwaukee, which purchased the plant in a court sale after it had gone into the hands of a receiver. Its capacity is approximately 7,500 tons of pulp a year, but it is probable this will be very materially increased. The Kieckhefer company paid approximately $100,000 for the property, but extensive improvements have been made since it took possession.

It is reported that a larger volume of pulpwood is moving over the Ashland division of the Chicago and Northwestern railroad this season than in the last three winters. High prices for pulpwood and the easier car situation are factors largely responsible for this movement. Loggers find it more profitable at the present time to convert hemlock into pulpwood than to saw it into lumber. Mill yards are reported to be filling rapidly.

Increases Capital Stock

The Wausau Sulphate Fibre company of Mosinee, of which O. A. Bache-Wiig is manager, decided to increase its capital stock to $6,000,000 at the meeting of the stockholders recently. Four million will be in common stock and two million in preferred. The board of directors and officers are re-elected.

The plant of the Northern Paper Mills, Green Bay, Wis., which was shut down for a short time, has again started up and the officials look for an early resumption of good business from orders recently received.

Kalamazoo Valley Annual Meetings

Annual meetings of various paper manufacturers in the Kalamazoo valley were held the early part of this month and election of officers and directors for 1921 were as follows:

Bryant Paper Co.

President, Frank H. Milham; vice-president, Noah Bryant; secretary, A. Allen Fox; directors, Frank H. Milham, Noah Bryant, C. Allen Fox, W. B. Milham, H. P. Kauffer, Joseph E. Brown, E. M. Irish, Felix Pagenstecher, Glenn S. Allen, Charles Clarage, of Kalamazoo; E. L. Brooks, Cleveland.

Kalamazoo Paper Co.

Directors: E. C. Parsons, Woodbury Ransom, C. S. Campbell, A. B. Connable, D. R. Curtenius, C. H. Kleinstuck, W. S.

UNION SCREEN PLATE CO.
Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

UNION BRONZE SCREEN PLATES
(Best phosphorized Cast Metal)
Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed
The Witham Screen Plate Fastener, Patented
THE ORIGINAL THE BEST

SCREEN PLATES *and* DANDY ROLLS
Watermarking a Specialty
Central Manufacturing Co.
The Quick Service House
KALAMAZOO MICHIGAN

Remember
WM. A. HARDY & SONS
FITCHBURG, MASS.
Originators and Oldest Manufacturers
OF THE
Cast Bronze Screen Plate
ALSO SPECIALIZE IN
Acid Resisting Digester Parts

Ticonderoga Machine Works
TICONDEROGA, N. Y., U. S. A.
MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties
SEND FOR OUR BULLETIN

Lockport Felt Company
NEWFANE, NEW YORK
MAKERS OF
Fine Felts for Fine Papers
ALSO MAKERS OF
Best Felts for *all* Papers
SATISFACTION GUARANTEED

Fourdrinier Wires
WISCONSIN WIRE WORKS
ALL MESHES OF PAPER MAKING *Wire Cloth*
APPLETON WISCONSIN

Fitchburg Duck Mills
ESTABLISHED 1844
FITCHBURG, MASS.
MANUFACTURERS OF
STANDARD AND MULTIPLE
DRYER FELTS
English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width
Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.

Do You Know That
Claflin Continuous Beaters
Have 3½ times the efficiency of other beaters in use today for Beating, Brushing and Refining Paper Stock?
For Increased Production, Greater Economy, Stronger, Finer, More Uniform Pulp, the CLAFLIN CONTINUOUS BEATERS will more than satisfy.
Ask Us for Our New Catalogue
THE CLAFLIN ENGINEERING COMPANY
LANCASTER, OHIO
The Canadian Fairbanks-Morse Company, Limited Agents for Dominion of Canada.

W. H. FURBISH, Vice-Pres. J. L. MUNRO, Treas.
PAPER TRADING CO.
10 High St., Boston, Mass.
Paper Mill Supplies
Dryer Felts, Paper Stock

RUSS GELATIN CO.
Factory—WESTFIELD, MASS.
MANUFACTURERS OF
GELATIN and GLUE
ANIMAL SIZING GLUE STOCK
LARGEST SPECIALISTS IN AMERICA ON
FINE WRITING PAPER SIZING
E. F. RUSS COMPANY 201 Devonshire S. BOSTON, U. S. A.

"Durable" Leather Belting
Water Proof and Oil Proof
Highest Grade
Especially for Paper Mill Use
For Emergency Orders—Write, Phone or Wire
The Cleveland Oak Belting Co.
Manufacturers 1239 W. 9th St., Cleveland, Ohio

STANDARD BLEACHING POWDER
Manufactured by
Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

Dewing, F. M. Hodge, A. E. Curtenius, Kalamazoo; D. F. Altland, Detroit; president, F. M. Hodge; vice-president, D. F. Altland; secretary-treasurer, A. E. Curtenius.

Rex Paper Co.

Directors: John F. King, C. A. Bradford, Edwin H. Hacking, Merrill B. King, W. M. Loveland, Kalamazoo; William G. Irwin, Columbus, Ind.; A. Aldrich, Beloit, Wis.; president, John F. King; vice-president, C. A. Bradford; secretary, Edwin H. Hacking; treasurer, Merrill B. King.

Standard Paper Co.

Directors: B. C. Dickinson, J. H. Dewing, A. L. Clark, H. S. Humphrey, E. A. Dunwell, J. A. Wheeler, C. H. Stearns, J. F. Byrne; president, B. C. Dickinson; vice-president, J. H. Dewing; secretary-treasurer, A. L. Clark.

King Paper Co.

President, A. L. Pratt; vice-president, E. S. Rankin; secretary-treasurer, George S. Davis; directors, G. S. Davis, J. H. Dewing, C. A. Peck, A. L. Pratt, E. S. Rankin, G. W. Ritchie, of Kalamazoo; E. J. Dayton, J. W. Thompson, Detroit.

Hawthorne Paper Co.

Directors: A. H. Dwight, F. M. Hodge, R. L. Pease, S. B. Monroe, J. H. Dewing, W. M. Loveland, C. H. Kleinstuck; president, A. H. Dwight; vice-president, F. M. Hodge; secretary, R. L. Pease; treasurer, S. B. Monroe.

Western Board & Paper Co.

Directors: A. E. Curtenius, W. H. Scott, P. C. Servaas, F. M. Hodge, M. Redmond; president, A. E. Curtenius; vice-president, W. H. Scott; secretary, P. C. Servaas; treasurer, F. M. Hodge; manager, Winship A. Hodge.

Lee Paper Co.

Lee Paper Company, Vicksburgh: President, Fred E. Lee, Dowagiac; first vice-president, George E. Bardeen, Otsego; second vice-president, A. B. Gardner, Dowagiac; secretary-treasurer, Norman Bardeen; directors, the above and Samuel Folz, Kalamazoo; C. H. McKain, Vicksburgh; John A. Howard, Dowagiac; George D. Cobb, Schoolcraft.

Eddy Paper Co.

Eddy Paper Company, Three Rivers and White Pigeon: President, Frank H. Milham, Kalamazoo; vice-president, Oscar Gumbinsky, Chicago; secretary, Charles E. Nelson, Three Rivers; treasurer, George Wolfe, Three Rivers; directors, the above and A. L. Pratt, Charles A. Blaney, E. S. Rankin, Louis Kirby, Henry L. Vanderhorst, Howard H. Buckhout, of Kalamazoo, and Harry Gumbinsky, of Chicago, the latter succeeding C. C. Colbert, of Elkhart.

Discontinues Making Parchment Paper

The Sutherland Paper Company, of Kalamazoo, Mich., has discontinued the manufacture of parchment paper and will in the future devote its entire attention to making boxboard, cartons and containers. L. W. Sutherland, president of the company, has sold to the Kalamazoo Vegetable Parchment Company the equipment of the parchment division.

The present building, which has housed the parchmentizing plant, will be converted into a box plant. Machinery and equipment is being ordered and will be installed as soon as received.

Needs 18,000 Tons of Straw

The River Raisin Paper Company, of Monroe, Mich., has a representative out buying straw for the new strawboard mill, which will be in operation within the next few months.

Large contracts are being made with farmers throughout Monroe county for their straw. The company has so far secured about 5,000 tons.

The new plant will use between 16,000 or 18,000 tons per year. The company is buying all kinds of straw, either dry or wet.

The capital stock of this company has been increased from $2,250,000 to $5,080,000.

BAILEY FLUID METERS
CUT STEAM WASTE

and give reliable, comprehensive information to those whose interest is centered in efficiency and operating costs.

Bailey Fluid Meter—Type C2, Class 24

Three kinds of correlated information are shown on chart.

1—The rate of steam flow
2—The steam pressure
3—The steam temperature

among BAILEY FLUID METER users are

American Writing Paper Co.
Great Northern Paper Co.
International Paper Co.
Dennison Manufacturing Co.
Laurentide Co., Ltd.
St. Maurice Paper Co., Ltd.
The Riorden Co., Ltd.
Strathmore Paper Co.
Lake Superior Pulp & Paper Co.

Let Our Engineers Help You

The BAILEY METER COMPANY
2023 East 46th Street, CLEVELAND, OHIO

THE NEWPORT COLORS *for Paper*

We are manufacturing an extensive range of high grade products for the paper maker. We particularly call your attention to our Newport Orange 2 R & 2 RG samples of which we are glad to supply to those who are interested.

NEWPORT TRADE MARK "COAL TO DYESTUFF"

Newport Chemical Works, Inc.
DELAWARE CORPORATION
Passaic, New Jersey
Branch Sales Offices
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Providence

Colors for Paper

We offer a complete line of Acid, Basic and Direct Colors in a variety of Shades suitable for all grades of paper.

Acid Violet
Acid Bordeaux B
Delaware Fast Red
Delaware Croceine Scarlet M O O
Delaware Orange Y
Delaware Croceine Orange
Delaware Eosine

Auramine
Victoria Blue
Methylene Blue O
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Malachite Green
Rhodamine B Extra
Methyl Violet

Benzopurpurine 4 B Concentrated
Direct Yellow
Congo Red

Samples matched in our Laboratory

A. Klipstein & Company
644 Greenwich Street NEW YORK CITY

Vulcan TRADE MARK

THE next time you are buying any kind of a cotton dryer felt, fourdrinier or cylinder wire, enamel or rubber apron cloth, felt washing powder, cotton tapes for cutters, etc., cotton or rubber belting, or any other requirement of a paper mill, get in touch with

MOREY-LORD CO.
60 India Street
BOSTON MASS.

Our services are at your disposal at all times, and all inquiries will be attended to in our most scrupulous and conscientious manner.

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

Send for full particulars

Hungerford & Terry, Inc.
PHILADELPHIA, PA.

Accident at Mullen Bros. Mill

Damage to building and machinery amounting to $5,000 was done at the Mullen Bros. paper mill plant in St. Joseph, Mich., recently when a heavy fly-wheel on a big steam machine engine broke, the pieces smashing their way through the engine room and breaking several automatic fire sprinkler nozzles, causing a portion of the mill's stock room to be flooded.

Arthur Hensch, engineer, escaped certain death by leaping through a window. He was painfully cut by jagged glass.

As a result of the accident the big mill was closed for 10 days.

Two of the paper mills at Otsego, Mich., have resumed operations on a part time schedule after having been closed about a month. The other mills will resume this week, it was announced Friday, one on full time schedule.

Stock Dividend Declared

The holders of the common stock of the United States Envelope Co. will participate in the distribution of a half million dollar melon as the result of the action of the board of directors at a special meeting in Springfield, Mass.

The distribution of surplus comes in the form of a stock dividend of 2,500 shares of the common stock of the company.

The directors voted to distribute to common stockholders of record on March 2, 1921, the 2,500 shares of the original authorized issue of common stock that has remained in the treasury, unissued, since the organization of the company in 1898.

Each common stockholder of record at the close of business, March 2, will be entitled to receive one share of common stock for every three shares of common stock he owns on that date.

At present there are 7,500 shares of the common stock of the company outstanding. It is quoted at $190 to $210 a share. The stock is closely held, probably less than 100 persons holding the entire issue.

In addition to the stock dividend the directors voted to sell at par 7,500 shares of common stock, which was authorized by the stockholders at their meeting, January 7, 1921.

Paper Companies Name New Officers

At a joint meeting of the directorate of the Niagara Wall Paper company, and the Defiance Paper company, held at their offices at Niagara Falls, N. Y., January 19, Thomas M. Uptegraff, secretary, was named vice-president and treasurer, and R. H. Torrey, assistant secretary, secretary of both companies.

B. D. Fuller, vice-president, continues in charge of manufacturing.

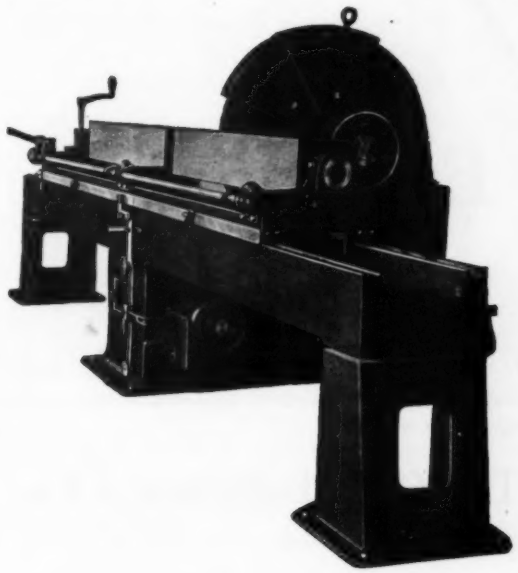
The offices of both companies are now: W. D. Uptegraff, president; Thomas M. Uptegraff, vice-president and treasurer; Benjamin D. Fuller, vice-president; R. H. Torrey, secretary.

Beaver Board Mill Resumes Operations

It is reported that the Tonawanda plant of the Beaver Board companies resumed operations on February 8th, when the first of the three shifts of fifty men each to be employed for the continuous operation of the mill was put to work. Only one of the two board making machines was placed in operation. An official of the company said that it is expected that the other machine will be started shortly, resulting in the employment of a much larger force than at present.

Officers of the company say that business conditions have revived to such an extent in demand for its products that it will be necessary to place the entire local plant in operation within a short time.

Automatic Knife Grinders



For Paper Knives, Rag Knives, Barker Knives, Adzing Knives, Stop Cutter Knives, Planer Knives, High Speed Knives, Veneer Knives, Stave Knives, Hog Knives, Tobacco Knives, Huller Knives, Stone Knives, and all knife and shear blade grinding requirements—Straight or Spiral Edge Grinding, Flat or Concave Bevel.

Straight Wheel, Cup Wheel, Ring Wheel Grinders. A complete line of full automatic machines of all sizes, types and styles. A machine for every service.

Write for catalog and secure our recommendations as to the machine best adapted for your requirements

Machinery Company of America

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Branch*: 304 *First Ave., South, Seattle, Wash.

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Our branches in these four locations will render you instant and satisfactory service covering your requirements for

Box Boards
and
Paper Specialties

It makes no difference how LARGE or how SMALL your order—you get what you want when you want it.

The C. L. LaBoiteaux Co.
Cincinnati New York
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BERTCHILL PAPERS · BHC · HIGHEST POSSIBLE QUALITY

PAPER and BOARDS
ALL GRADES

Direct Mill Service to the Paper Merchant

SERVICE is the greatest factor in mill representation. Prices, samples and information on any grades of paper and boards, will be furnished upon request. Exclusive representation of paper and board manufacturers enables us to offer direct mill service. All sales made for the mill direct to the paper dealer.

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INCORPORATED
Exclusive Mill Sales Agents
501 Fifth Avenue at 42nd Street
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Cold Pipe Bending Machines

Models E & F

Standard of the world.

Bends all sizes of pipe from ⅛ in. to 8 in. Hand or motor operated.

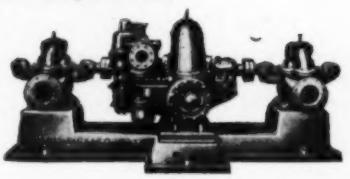
Send for catalog.

Standard pipe bends, 1" to 6" pipe in stock for immediate delivery.

American Pipe Bending Machine Co.
12 Pearl Street, BOSTON, MASS.

EARLE
CENTRIFUGAL PUMPS

For Service Where Quality Counts



THE EARLE GEAR & MACHINE CO.
4711 Stenton Ave., Philadelphia, U. S. A.

CYCLONE Grate Bars
Manufactured by
CYCLONE GRATE-BAR CO.
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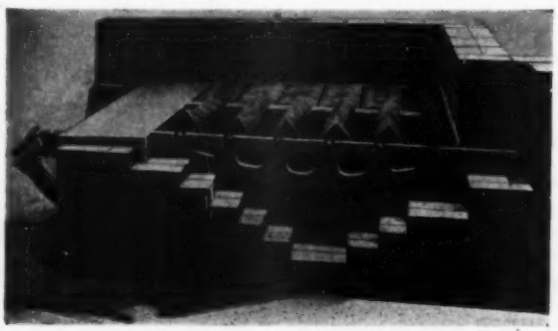
Metal Uniformly Distributed

Each Grate a Solid Casting

Will Outlast Any Grate Made



Takes Care of Expansion and Contraction

Will Not Warp

Easy to Install

Cyclone Grates will save at least 10 per cent in fuel, over stationary grates.

CYCLONE Grate Bar Co.
BUFFALO, N. Y.

Big Amount of Pulp Wood

The International Paper Company at its Corinth plant during January received 1,519 carloads of pulp wood. There are now approximately 70,000 cords of woods in the yard. About 400 cords of wood are used every twenty-four hours at the mill.

The Robert Gair Company, of Brooklyn, N. Y., extensive manufacturers of folding boxes and containers and other paper products, has filed a notice of reorganization with an active capital of $10,000,000, with $3,000,000 in preferred stock and $4,000,000 in common stock.

The Nuera Paper Company has awarded a contract for the erection of a two-story addition to its mill at Hadley, N. Y., 40x188 feet to cost about $100,000, including improvements in present buildings. The new structure will be equipped as a machine works.

A New York syndicate has purchased for the sum of $60,000 the Perseverance Paper Mill, of Lambertville, N. J. Extensive improvements are to be made and the mill will then be devoted to the manufacture of news paper exclusively.

The Rainbow Paper Corporation, mill representative of 239 Broadway, New York, has increased its capital stock from $100,000 to $250,000.

Diem & Wing Paper Co. Elects Officers

At the annual meeting of the stockholders of the Diem & Wing Paper Co., Cincinnati, O., held Saturday, January 22, all officials serving last year were re-elected for the ensuing one. They are: President, Albert Diem; vice-president and general manager, L. H. Heid; vice-president, Wm. O'Hara; treasurer, Alvin Bodemer; secretary, P. A. Stuhlreyer; assistant secretary, A. L. Brown; assistant treasurer, W. F. Roemler.

These officials, together with the two following named directors were re-elected, Albert Evers and J. W. Sturm, constitute the directorate of the company.

Will Run Barge Line on the Mississippi River

The Hinde & Dauch Paper Co. of Sandusky, O., with mills at many different points in this country and Canada and which recently purchased the plant of the Brown Paper company, Fort Madison, Ia., where they are planning to build a large box board mill, is also said to be planning to build a wharf on the Mississippi, and to purchase steamers and barges to handle both raw materials and finished product, by water.

Rebuilding United Paper Board Co. Mill

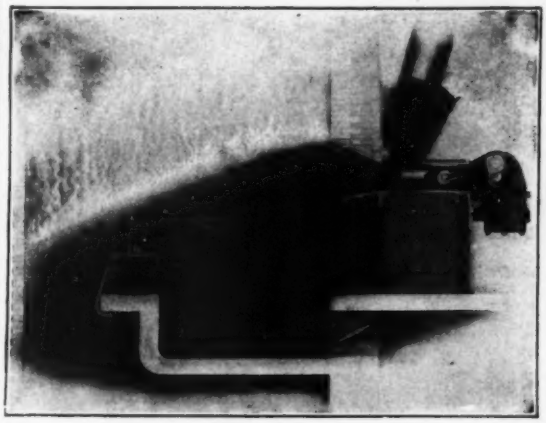
First work on the rebuilding of the straw board mill of the United Paper Board Co., Peoria, Illinois, will begin soon according to reports said to have come from E. C. Foster and W. H. Shew, officials of the company, whose plant was destroyed by fire last fall.

No definite decision has been reached as to how pronounced a change will be made in the plant. The saw department and the beater room will be enlarged, Mr. Shew says. The other departments will be rebuilt.

New Mill in Texas

The first car load of machinery for the pulp mill building at Commerce, Tex., has arrived. It is hoped to have the plant in operation within a few months. The mill will manufacture pulp from cotton seed hulls and short cut cotton linters and will be the only plant of its kind west of the Mississippi river.

Cut Your Production Costs



Cross-section through stoker, showing automatic operation

AFTER 5 years of unequalled industrial activity comes a breathing spell that provides the opportunity for long deferred repairs and improvements that will enable you to CUT YOUR PRODUCTION COSTS IN THE FUTURE.

RILEY UNDERFEED STOKERS

At one plant where Riley Underfeed Stokers were recently installed, six boilers equipped with Rileys easily carry the load that ten boilers with another type could scarcely meet.

Not only this but a cheaper grade of coal is being burned with a saving of 25 to 30% in amount of fuel used.

Consider carefully what such savings would mean in your plant and you will decide that NOW is the time to investigate and install Riley Underfeed Stokers.

Let us send you our Catalog D-3

Sanford Riley Stoker Co.
Worcester, Mass.

Boston New York Philadelphia Pittsburgh Buffalo
Cleveland Detroit Cincinnati Chicago St. Paul Denver

A REAL Solution to Newsprint Handling

Picks up from either horizontal or vertical position a 72" roll or its equivalent in small rolls.
Stacks on end in car or warehouse.
Easy and simple to handle and will operate all day on a 25-cent charge of electricity.

Write for information on Type L

The Elwell-Parker Electric Company
"Pioneer Builder of Electric Industrial Trucks"
Cleveland, Ohio, U. S. A.

CRANES

Practical designs for every class of service, the product of over 35 years engineering and manufacturing experience. 1 to 250 tons capacity

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General Office and Works, HARVEY, ILLINOIS
Representatives in 25 Principal Cities

DO YOUR HOISTING WITH

NORTHERN CRANES and ELECTRIC HOISTS Catalogs Free

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Satisfaction That Grows

Most any machine of passable construction, if reasonably well fitted to its job, will give a degree of satisfaction—at first.

But the real test comes later. There's nothing like long service for establishing beyond question whether a machine has or has not the ability to handle its work satisfactorily.

With the Langston slitter, the longer you use it, the better the results will please you.

In the beginning, you are certain to be satisfied with the way the Langston slitter turns out the work.

And this initial satisfaction mounts steadily as you see how the Langston slitter keeps on operating smoothly, continuously, day in, day out. You'll appreciate the way it has of stacking up the work—and the dollars, too.

Two generations of hard, every-day experience are built into the Langston slitter. We will be glad to show you, without your incurring the slightest obligation, how well this experience has adapted the Langston slitter to solve the problems you're up against.

SAMUEL M. LANGSTON CO.
CAMDEN, NEW JERSEY, U. S. A.

Langston—for Paper Working Machinery

A $2,000,000 Paper Mill and Reforestation in Louisiana

It is reported that a large modern paper mill costing $2,000,000 will be built at Monroe, La. The reason for locating there is because of the abundance of wood from saw mills and nearness to the Monroe gas fields for cheap fuel. The Louisiana State Forestry Department will co-operate with the projectors of the mill, who plan an extensive reforestation development in connection with the mill's supply of raw material.

Paper Making in the South

The paper industry is assuming proportions heretofore not thought of, in the southern states. More than a dozen large mills are under construction now, or have just recently been completed in Alabama, Georgia, Louisiana, Mississippi, North and South Carolina, Tennessee, Texas, Virginia and West Virginia.

In addition to mills using wood as a raw material, a number of plants have recently been started to make paper from sugar cane, bagasse, cotton linters, rice straw, etc., materials that have heretofore been discarded as waste.

Paper Pulp from Sawgrass

The manufacture of commercial paper pulp from Florida sawgrass has been completely demonstrated as a reasonable and profitable industry. Two large pulp factories are being built in this state, one at Leesburg and the other at Fort Myers; a third will be built, according to announced plans, at Moore Haven.

The Birman-Zadik Paper Co., San Antonio, Tex., has sold its business to two of its former employes, Louis E. Sein and W. W. Shiner, along with Albert C. Sein, and the new firm will hereafter be known as the Shiner-Sein Paper Co.

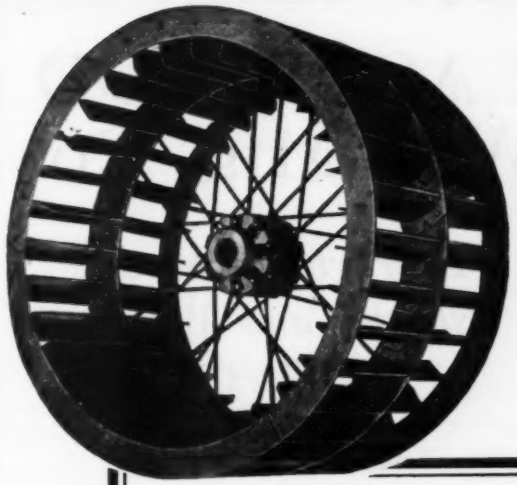
Arthur R. Rapp Company Is Growing

This Chicago company announces that E. Vernon Fox of Chicago has resigned his position with the Nekoosa-Edwards Paper company, to take effect immediately. He has become vice-president and secretary, with a substantial interest, in the Arthur R. Rapp company, Conway building, Chicago. Mr. Fox has been with the Nekoosa-Edwards Paper company for four years, part of the time taking care of the eastern territory, and later in charge of their Chicago office. For five years prior to his association with the Nekoosa-Edwards Paper company, he was manager of sales of the Wausau Sulphate Fibre company, manufacturing Mosinee Kraft, and in 1912 and 1913, before its reorganization, was manager of sales of the Spanish River Pulp & Paper Mills. His paper experience dates back to 1898, at which time he was with J. C. Brocklebank in the western office of the Manufacturers Paper company.

They also wish to announce that P. O. Larson of Chicago, formerly of A. C. Allen Paper company, Chicago, will become assistant to Mr. Rapp in the Chicago office, also that Chas. M. Clark has been made vice-president and treasurer of the company.

C. A. Hubbard

Mr. C. A. Hubbard, formerly sales manager for Bryant Paper Co., will engage in the paper business in Kalamazoo, having already leased suite 401 in the Peck Building in that city. He has made arrangements to take the product of the Harper machine of the Peshtigo Pulp and Paper Company at Peshtigo, Wis. The greater part of the tonnage will be made up in onion skin and the balance in light weight bonds—all the output to be sold to the paper merchants. The paper machine is now being set up and is expected to be in operation by the first of March.



Bayley

PLEXIFORM FANS

furnish a great volume of air at medium or low pressures. They require a minimum of housing and motive power and operate equally well with single or double width wheel. They give highly satisfactory service in paper mills as they eliminate that objectionable ceiling drip in the machine room.

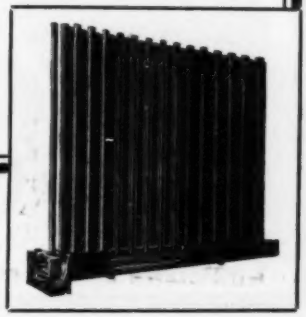
CHINOOK HEATERS

are built on the tube within a tube system, free from return bends, elbows and nipples. Each tube a radiator in itself, easy to repair in case of accidental damage, as it is only necessary to remove the damaged tube and replace it without disturbing the balance of the installation. Can be shipped K. D. to save freight.

BAYLEY ENGINEERS

will work with you in planning your installation. Their services are yours for the asking.

BAYLEY MFG. COMPANY
Milwaukee, Wis.



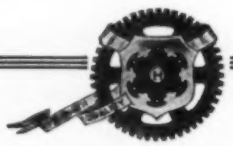
EASTWOOD Wire Mfg. Co.

Fourdrinier Wires
Cylinder and Washer Wires

Belleville, New Jersey
U. S. A.

WE ALSO MANUFACTURE

Valves, Unions, Cocks, Fittings, Digester Parts, Castings, etc., for Sulphite Mills from Our Perfection Bronze



Friction Clutch Engineers

The big, broad field of engineering is made up of those who have made a specialty of some particular branch.

The Hill Clutch Company's engineers have made a study of the design and application of friction clutches for a period of 37 years. Whenever you wish to consider friction clutches—and you probably have need of some in connection with your line shaft equipment or on individual machines, which you have never thought of—consult us.

You will be placed under no obligation in receiving our recommendations and quotations covering your contemplated requirements.

Our Catalog No. 8 contains a lot of clutch data well worth having handy for reference. Copy will be mailed upon request.

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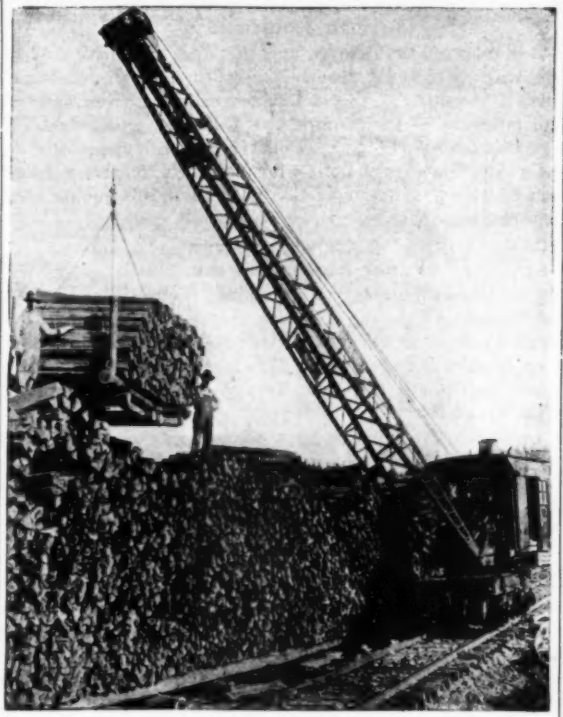

BROWNHOIST

Handling Materials at the Mill

IS YOURS one of the many mills which handles considerable pulp? Some of these have found it to be more rapid and economical to do this handling with a Brownhoist locomotive crane. A Brownhoist will not only place the pulp wherever it is needed, but will handle your coal, switch the cars and take care of innumerable jobs which come up around the yard. If you have much handling to do, our long crane experience should be of use to you. We will gladly give you any information for the asking.

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Bouffard-Bergevin

Bouffard-Bergevin of Montreal, P. Q., Canada, is a new firm organized to handle pulp and paper mill supplies exclusively. Their line includes, paper machine clothing, pulp stones, chemicals, etc., in which they represent some of the well known firms in the United States and Europe.

Although they do not sell oils they have a technical service department pertaining to efficient lubrication acting independent from any oil companies, but handle proper lubricating oil apparatus for different conditions.

Mr. H. A. Bouffard is a former mill man, having been connected with paper mills in the United States and Canada before going overeas. Recently he has been in the technical service department of the Brompton Pulp & Paper Co., Ltd. Mr. A. J. Bergevin is a former banker and is also a returned man.

M. E. A. D. Co.

It is a pleasure to observe the stepping out into the channels of business prosperity the Management Engineering and Development Co. of Dayton, O., of which Howard S. Taylor is the president. Mr. Taylor recently delivered a very interesting and educational address before the Technical Section of the Canadian Pulp and Paper Association on the subject of Ventilation.

Mr. Taylor is well known to both the Canadian and American Technical Associations, being chairman of the committee on heat, light and power of T. A. P. P. I. His papers have always proved of special interest.

F. W. Monaghan Joins Bagley & Sewall Co.

The Bagley and Sewall Co. of Watertown, N. Y., announced that Frank W. Monaghan, formerly superintendent of Wausau Sulphate Fibre Co., has joined their organization.

Since they have demonstrated that they know how to design and build the fastest paper making machines and Mr. Monaghan has demonstrated that he knows how to operate them, they believe it to be a good combination and for the ultimate benefit of the whole industry which they aim to serve.

Dye and Chemical Company Expands

For the purpose of establishing closer relations with consumers of dyes in the United States, the Society of Chemical Industry in Basle, Switzerland, have decided to enlarge the existing Ciba Company, Inc., distributors of dyestuffs, intermediates and chemicals, with offices at Cedar and Washington streets, New York City.

To insure their customers the best possible service, they have taken over the entire organization of the Aniline Dyes and Chemicals, Inc., of New York, with its branches in Boston, Philadelphia, Chicago and Columbus, Ga.

The Ciba Company, Inc., are in a position to offer to the trade both Swiss and American colors in a complete line of standard quality and furnish a service of exceptional merit.

Edward R. Ladew Co., Inc., of New York City, tanners and leather belt manufacturers since 1835, have closed their sales office at Charlotte, N. C., and transferred their southern headquarters to 95 South Forsyth street, Atlanta, Ga. An ample stock of belting and leather specialties will be carried, with the usual facilities for special work and engineering service.

Geigy Company, Inc., manufacturers of aniline colors, extracts, etc., have opened a branch office in Cincinnati, O. Mr. B. C. Blowney, who for many years has been active in the dyestuff field, has been placed in charge of the new branch, located at 232 East Pearl street, Cincinnati, O.

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Our Cylinder Wet Felts for 9 points straw and for roofing are *open* in texture, *do not* stretch and *are durable.* A trial is invited.

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THERE is a well defined belief existing among paper manufacturers and jobbers that the forthcoming month will witness a decided revival of trade activity in paper. This feeling is general, and nearly everyone advancing an opinion in this connection has facts and figures to substantiate his contention. Confidence prevails throughout the trade that by the middle of March demand for the various kinds of paper will be developing along normal lines and that ample business will be available to keep mills running full and to keep distributors busily engaged.

It can be stated that even now the market displays a much healthier and improved tone over that existing during the past several months, although buying by consumers is still limited and manufacturers and jobbers in common are in want of orders. There is nevertheless a better demand than was encountered a few weeks ago, and everything would seem to point to the market gradually but surely working back into its normal position. Buyers are not so cautious about placing orders when they are in need of paper, and it is noticeable that the average order today involves larger tonnage than has recently been the case; still, consumers are operating in the market in restricted fashion. Few users of paper are purchasing other than supplies directly required, and it is but to be expected that with activity in most other industries of curtailed compass that demand for paper should be light because of the fact that consumption is not what it ordinarily is.

Plenty of signs are visible, however, that industrial activity in the United States is well on the road to recovery after a prolonged period of dullness and wide fluctuation in prices on nearly all commodities. Some trades have resumed operations to an encouraging extent, and it but stands to reason that the paper industry must soon feel the effects of the increased business in other lines. Another situation which bespeaks well for the paper trade is that prices on various kinds of paper are being rapidly readjusted on more normal levels. Manufacturers are bringing down quotations to a point where consumers cannot fail to regain confidence in the stability of values, and it is generally conceded that when this confidence is fully reestablished that buying will increase.

Members of the trade base their predictions of broader business by the middle of March mainly on the situations developing in those industries on which the paper manufacturer and jobber chiefly depend for orders. The textile, the clothing, printing, publishing and various other trades are showing new life under the stimulus of a general revival of buying by the public, and a large majority of those in a position to express authoritative opinions on the business outlook is that conditions will continue to show consistent improvement from now on until markets again reach something like a normal status. Moreover, it is generally felt that 1921 is going to prove a good business year. During the course of the next month a new administration will take hold of the Government in Washington and it is expected much legislation will be passed that will aid business and the business man in this country. The financial skies are slowly but surely clearing up, and an easier money market is bound to have a helpful influence on trade conditions. But best of all possibly is that the common sentiment is that business is going to be active and healthy, and there is no gainsaying that when a great majority of those conducting the business of the nation feel confident that business is going to be good that such will be the case, because, after all, sentiment plays a large and important part in the commercial world.

There have been quite a few broad changes in paper prices. Manufacturers in numerous cases have lowered quotations sharply with the intent to get prices down to levels where consumers could not use high prices as an excuse for not buying, and, incidentally, with a view of giving the buyer of paper the benefit of such decline as has occurred in raw materials that enter into the making of paper. Prices on some kinds of paper are now down to seemingly attractive levels. In fact, certain grades are now selling in the open market at lower prices than at which contract buyers are obtaining supplies, with the result that transient business is steadily picking up.

Authoritative reports are to the effect that spot lots of news print in standard rolls are being sold at as low as 6 cents a pound at the mill. The price is doubtless a bit under the average market level, as most producers of news print are asking closer to 7 cents for prompt deliveries. The contract basis is well maintained at from 5 to 6.50 cents per pound, with the largest single producing company naming the higher figure

Book papers have weakened in price somewhat. Machine finished book is selling to the transient trade at down to 11 cents per pound f. o. b. mill, while contract quotations range as low as 8 cents. Supercalendered book is quotable at around 13 cents at the mill for spot shipment, and at a cent and a half to two cents less on contract. Wrappings and tissues are generally available at lower prices, with the sharpest decline recorded in No. 1 domestic kraft wrapping, which is selling at around 9 cents a pound at the mill. Fine papers are also lower. The American Writing Paper Company recently announced a 15 per cent reduction in prices on all its products, and most manufacturers of similar grades of paper have effected the same revision of quotations.

After selling off to new low levels the board market has firmed to a perceptible degree and quotations now range around $50 on plain chip and $55 on filled news f. o. b. mill. When prices on chip board worked down to below $40 a short time ago buying increased in such volume that the market quickly advanced back to previous levels, where it now seems firmly established.

A. W. P. Co. Revise Prices

The American Writing Paper Co. have announced to the trade a revision of prices on Eagle-A Mill brands effective February 1.

They have stated that the manufacturing costs of both the bleached sulphite pulp mills and of the mills making fine papers do not warrant the reduction, but the readjustments were made in order to meet the almost universal sentiment prevailing among the consumers of papers and the printing trades, reinforced by the advices of mercantile friends, that so-called readjustments would restore confidence in the paper industry and bring about a stable and active market within the shortest period of time.

Since coming to the decision to yield to these importunities, they announce that the situation has been appreciated likewise by several pulp mills, many paper mills, and merchants generally, and improvements in the manufacturing situation are therefore already in evidence.

Only one-third of the newspapers issued in 1919 were printed on the product of American forests.

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Domestic Raw Materials

Papermaking Rags

There is still a lack of important trade activity in papermaking rags. In some directions the market exhibits a little more life, but on the whole the movement of supplies into consuming channels is decidedly light, and indications are that the longer the present waiting condition continues to prevail the more favorable the market position becomes for the buyer of rags. It is true that dealers are bullishly inclined and that they are mostly refraining from pushing stocks onto the market, yet it stands to reason that with mills purchasing in such limited volume accumulations of rags are piling up, which of course weakens the technical status of the situation.

It can be said that almost all the business now passing is of routine character. Paper manufacturers are coming into view as buyers only when in immediate need of supplies, and with activities at paper mills on a materially curtailed scale, the need for rags is not what it ordinarily is. Everything would seem to point to the average mill having fairly large stocks of rags; in fact, some of the reports received in this connection infer that supplies at consuming plants are generally of such magnitude as to lead to the belief that a good many manufacturers will not find it necessary to resume buying in wholesale fashion for quite a spell. On the other hand, there are numerous dealers who express the belief that mill stocks are at a low point and that a revival of demand cannot be far off, it being their contention that papermakers have been gradually running out stocks of raw material during the period of dullness in the last several months while keeping out of view as buyers.

With the exception of declines in some grades of new cuttings, prices hold fairly steady. White shirt cuttings, white lawns, unbleached muslins and other descriptions of new rags have eased off in value to an extent, due evidently to the continued lack of demand from consuming quarters. Old rags are quoted at about unchanged levels. If anything, prices on roofing stock are firmer in tone although no actual alteration of note has occurred. Signs are not wanting that at least certain roofing felt mills are willing to place orders for sizable tonnage for future delivery at current prices but packers refuse to enter into forward commitments excepting at an advance in price which buyers will not grant.

There is little stirring of importance in the foreign rag section. Occasional sales are recorded but there is no concerted movement of any grade in any single direction. Reports are to the effect that plentiful supplies of rags are available in European countries provided that buyers pay a little more than they now offer.

Quotations f. o. b. shipping points follow:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	18.00–19.00
White shirt cuttings, No. 2	9.50–10.00
Fancy shirt cuttings	10.00–10.50
Washable, No. 1	7.75– 8.00
Unbleached muslins	14.50–15.00
White lawns	16.00–16.50
Overall cuttings, blue	10.00–10.50
Black silesias	5.50– 6.00
Old Stock—	
Whites, No. 1 repacked	9.50–10.50
Whites, No. 2 repacked	4.25– 4.50
Whites, house soiled	2.75– 3.00
Whites, street soiled	2.50– 2.75
Thirds and blues, repacked	3.00– 3.25
Thirds and blues, rough	2.25– 2.50
Black stockings	2.75– 3.00
Lace curtains	6.25– 6.75
Cotton canvas, No. 1	4.50– 4.75
White cotton batting	3.00– 3.25
Roofing, No. 1	1.00– 1.10
Roofing, No. 2	.90– 1.00

Rope and Bagging

Only a slight movement of old ropes and bagging toward consuming centers is noted and prices on most grades are on lower levels. Paper manufacturers continue to evince a surprising lack of interest in old bagging. Leading users are buying merely in inconsequential lots and the aggregate movement of supplies is far below normal volume. One of the chief reasons for this apparently is that a good many mills are consuming jute butts instead of scrap bagging, and another is of course that with mills operating on short time they do not require as much raw material as usually.

Old rope is sought in rather small amounts, although there is relatively more demand for this article than for bagging. There has been sales of No. 1 Manila rope to mills at 4 cents a pound at shipping points, which figure represents about the market value of rope at present. Scrap bagging can be easily obtained in fair-sized lots at 1.75 cents per pound and No. 1 domestic gunny at 2 cents. Mixed strings are quoted at 1.75 to 2 cents. F. O. B. shipping point prices are:

	New York and Chicago
Gunny, No. 1 domestic	2.00-2.25
Gunny, No. 1 foreign	1.75-2.00
Scrap bagging, No. 1	1.75-2.00
Roofing bagging	.70- .80
Wool tares, heavy	2.25-2.50
Wool tares, light	2.20-2.40
Manila rope, No. 1 foreign	4.00-4.25
Manila rope, No. 1 domestic	4.00-4.25
Sisal strings	2.75-3.00
Mixed strings	1.75-2.00

Old Papers

Moderate activity characterizes the old paper trade, yet the market is far from its normal status in point of the volume of business being transacted. Consuming mills are buying only against direct requirements and it is quite apparent that specialty grades are more generally wanted than the bulky descriptions, with the result that the aggregate movement toward mills is light and of insufficient volume in most instances to have strengthening influence on values. There have been slight advances scored on some of the low qualities of stock, especially those used by box board manufacturers, but on the other hand high grades have eased off to lower quotable levels. To say the least, the market remains in an unsatisfactory state from the seller's point of view, and there is much complaint registered by dealers and packers over their inability to produce bulky grades at a profit at prevailing prices.

There seems little question that the wood pulp situation is

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in part responsible for the limited demand for old paper. Paper and board manufacturers experience no difficulty in securing all the pulp wanted at fairly attractive costs and therefore are using more of this material and less waste paper. It is also quite apparent that a good percentage of the waste paper available is not being collected today, particularly in the large cities where labor is high, and should the paper industry become as active as it was last year there is no doubt that this loss of supply of raw material would be seriously felt.

Hard white shavings of No. 1 quality have sold to mills at as low as 4.75 cents per pound at shipping points, and No. 1 soft white shavings at 3.75 cents. White blank news cuttings hold up well in price at between 2.75 and 3 cents a pound, while heavy No. 1 book stock is quotably firm at 1.50 cents and a little higher. Folded newspapers are selling at 65 to 70 cents per hundred pounds at shipping points and No. 1 mixed paper at 55 to 60 cents. Ledger stock is quotably lower as is old kraft paper. F. o. b. shipping point prices follow:

	New York and Chicago
Hard white shavings, No. 1	4.75-5.25
Hard white shavings, No. 2-3	3.50-4.00
Soft white shavings	3.75-4.25
Colored shavings	1.50-1.75
Heavy book, No. 1	1.50-1.65
Crumpled No. 1	1.25-1.35
Ledger stock	2.50-2.75
Kraft, No. 1	2.25-2.50
Manilas, No. 1	1.15-1.25
White blank news	2.75-3.00
Overissue news, No. 1	1.00-1.10
Folded news	.65- .75
Mill wrappers	.80- .90
Box board cuttings	.60- .70
Mixed paper, No. 1	.55- .60
Common paper	.30- .40

Chemical Pulp

After exhibiting a firmer tone under increased inquiry from consuming quarters shortly after the turn of the year, the chemical wood pulp market has again become dull, and there is little life of important character in any corner of the trade. Business is being done, of course, but its scope at present is narrow, and, moreover, consumers show but slight disposition to broaden their buying. When the position of paper manufacturers is considered, it is not surprising that they are unwilling to stock up raw material. While everyone anticipates an appreciable enlargement of demand for paper of various kinds, manufacturers are not positive that trade in their product will develop in the volume they expect, and accordingly are playing the safe game insofar as concerns the absorption of raw stock. Most mills are working on a theory of using up accumulations of pulp and other raw material and purchasing additional supplies only as needed, presumably feeling that sufficient pulp will be available when they want it even though consumption should increase.

The feature of the market has been the easing off of prices, especially on domestic pulps. Some sellers have been so anxious to dispose of odd lots of certain grades that spot sales have been registered at prices below the contract basis. Domestic bleached sulphite has sold at 7.50 cents a pound at pulp mills, and probably for less, while news grade sulphite has sold down to 5 cents, easy bleaching sulphite at 6.50 cents and No. 1 kraft pulp at 4.75 cents. Soda pulp is offered in larger quantities than for a long time at between 7 and 7.50 cents.

Quotations f. o. b. pulp mills are:

Bleached sulphite	7.50-8.00
Easy bleaching sulphite	6.50-7.00
Unbleached sulphite, No. 1	6.00-6.50

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News grade sulphite	5.00-5.50
Soda pulp, bleached	7.00-7.50
Mitscherlich unbleached	7.00-7.50
Kraft, No. 1	4.75-5.00
Screenings, refined	1.50-1.75

Mechanical Pulp

The continued absence of worthwhile demand for ground wood has occasioned increased selling pressure and prices have tumbled with marked rapidity. So many different reports are heard regarding sales at low prices that it is difficult to ascertain just what are representative market levels. Certainly domestic ground wood of prime quality in fairly large tonnage is to be had at $75 a ton at grinding plants, and it is known that consumers have effected some purchases at substantially less than this figure. Probably a fair range of quotations would be $65 to $75 a ton although there is some doubt whether sizable amounts can be secured at the lower edge. It is maintained by producers and dealers that there is no over-large surplus in the market, but seemingly the failure of board bills and other consumers to absorb their customary amounts of pulp has led to the accumulation of stocks in certain quarters and has created the weaker price tone.

Ground wood from European sources is being imported in moderate tonnage and importers report they are obtaining $80 and more for such pulp ex the dock. It is hard to figure, however, why consumers will pay this price when they can buy domestic ground wood so much cheaper.

Chemicals

Aside from contract business, there is little activity of importance in pulp and papermaking chemicals. Consumers are entering the market only at spasmodic intervals when in urgent need of supplies in addition to contract commitments, and the falling off in export shipments accentuates the quietness obtaining. Prices in a majority of instances are merely holding their own with such changes as have occurred mostly in a downward direction. Prices range as follows:

Alum, lump ammonia	4.00- 4.50
Alum, lump starch	7.50- 8.00
Alum, powdered	5.00- 5.50
Blanc fixe, powdered	5.00- 5.50
Bleaching powder (domestic drums)	3.25- 3.50
Brimstone (ton)	15.00-16.00
Casein	14.00-16.00
Caustic soda, spot delivery	3.75- 4.00
China clay, domestic, washed	8.75-10.00
China clay, foreign	14.00-16.00
Rosin, grade E	8.75-
Satin white	2.25- 2.75
Soda ash, 58 per cent light (bags)	2.00- 2.25
Sulphite of alumina, commercial grade	3.00- 3.25
Starch, papermakers', in bags	3.43-
Talc (ton)	16.00-18.00

Newport Chemical Co. Makes Changes

The Newport Chemical Works, Inc., has discontinued its New York office. All business heretofore conducted at this office will be handled at the general offices at Passaic, N. J.

The officers of this company are: C. N. Turner, president; E. H. Killheffer, vice-president, in charge of sales; J. F. Blackie, vice-president, in charge of operation; H. H. Springford, treasurer; R. W. Wilmer, secretary.

C. N. Turner, president of this company, formerly located in Milwaukee, has moved his office to Passaic, N. J.

The Leshner Paper Stock Company, Inc., of Hamilton, O., has filed notice with the Secretary of State at Albany, N. Y., of the designation of J. J. Patricof as New York representative at 501 Fifth avenue, New York City.

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¶ Are you receiving all the Clay you need and the grade that you want? Or are you accepting any old grade just so long as you can get delivery?

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¶ We are in a position to give this same Service to you.

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QUALITY: Lowest grit and moisture contents of any clay, domestic or foreign.

DELIVERIES: Reserve stock always on hand.

PLANTS: Three huge plants at McIntyre, Ga., under direct control of Edgar Bros. Co., also Saylorsburg, Pa., and Gordon, Ga.

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110 William Street NEW YORK

New Papers

Writing—	
White rag	25-45
White sulphite, No. 1	14-20
Colored	16-24
Ledger—	
White rag	25-50
White sulphite	16-25
Colored sulphite	18-26
Colored rag	27-
Bonds—	
White rag	16-45
White sulphite	14-23
Colored sulphite	16-26
Colored rag	18-
Book—	
No. 1 S. & S. C	12.50- 13.50
Machine finished	11.00- 11.50
English finished	12.00- 13.00
Coated and enameled	14.00- 16.00
Lithograph, M. F	14.00- 15.00
News Print—	
Rolls, contract	5.00- 6.50
Rolls, transient	6.50- 7.00
Sheets	7.50- 8.00
Side runs	4.50- 5.00
Cover Stock—	
Coated, both sides	11.25-
Coated, one side	11.20-
Wrappings—	
No. 1 kraft	9.00- 9.50
No. 2 kraft	8.00- 8.50
Boards—	New York and Chicago
Solid news	60.00- 65.00
Straw	55.00- 60.00
Plain chip	45.00- 50.00
White coated chip	80.00- 85.00
Manila coated chip	75.00- 80.00
Binders board	100.00-110.00

Robert Gair Company Gets Chicago Coated Board Company's Mill

The merger of the Chicago Coated Board company in the Robert Gair company, with headquarters at Brooklyn, N. Y., which is now an accomplished fact, was the next step to the merger of the eastern mills at Piermont, Thames River and Haverhill, formerly controlled by the same interest, also the purchase of the straw board mill at Quincy, Ill., to complete the chain. The mills and the factories form a consistent circle of plants, which co-ordinate in the production and conversion of board with facilities which balance the whole production scheme.

The three eastern mills, were merged with the Robert Gair company a year ago, and the complete organization as it now stands has been successfully welded into a unit. The mills and factories continue to be operated under the same supervision and by the same experienced personnel that have "grown up," so to speak, under the effective management that has existed in the past.

The same policy will be continued at the Chicago Coated Board company, where F. D. Wilson will remain in complete authority in sales matters, and Mr. MacMillan will continue to have charge of the production department. There will be no change whatsoever in the staff and an extension of the mill's facilities is upon the program of the new company.

In addition to the Chicago Coated Board company's mill, the new company purposes to erect the largest board producing mill in the world on the hundred acre property which it owns at Riverdale, 18 miles south of the loop. The mill will represent the best thought of the company's engineers and will contain the last word in papermaking machinery. It will be so laid out that the expansion planned for the future can be carried through consistently, and the mill will have alongside of it space enough for the erection of a fibre container finishing plant and a corrugated container plant, all of which will be developed as rapidly as possible.

The new company will maintain and will endeavor to extend the excellent relationship that has existed between the Chicago Coated Board company and its customers. In their interests, quality and service will be rigidly supervised, promoted and improved.

Those who have watched the developments in connection with Chicago Coated Board company are aware that a large tract of land was purchased some little time ago, at or near Dolton, Ill., and adjoining the Calumet river. It is a foregone conclusion that board mills will be built upon this property at no far distant date. The property now occupied by this plant on North Water street is directly in line with the new boulevard system, on which work will start during the present year. It will therefore be necessary to raze the present plant, and when this time arrives ample provision will be made to maintain service to the customers of the company. The first move will be to erect a plant on the new property and install one complete board machine, which will unquestionably be of very wide trim. This machine will be placed in operation before closing down at the North Water street plant. With the new mill in operation one of the old mills will be taken down and moved to the new location, still maintaining the original number of machines in operation. The machines thereafter will be moved one at a time with no curtailment and greater production when the final machine is installed in the new location.

The policy of marketing not only the products of the Chicago Coated Board company, but of the Alton mill and the Lafayette mill, the two latter under the management of J. D. Wilson, will be continued as in the past, the change of ownership not affecting the present policy in regard to sales.

Richardson Company New Roofing Plant

The Heppes Roofing Division of the Richardson company are moving into the most modern roofing plant in the world, located at Melrose Park, Ill., which means the abandonment of the old plant at 4500 Fillmore avenue, Chicago, for manufacturing purposes. The new plant at Melrose Park will cost at least a million dollars, and is devoted entirely to the manufacture of asphalt, roofing and shingles, "Flex-a-tile House Tops."

O. A. Heppes, vice-president of the Richardson company, is in charge at Chicago.

Niles R. Johneson, vice-president and general manager of the Scandinavian-America Trading Co., 50 E. 42nd street, New York City, has been spending several weeks in Bermuda.

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Wood Pulp

With paper manufacturers as a general thing holding off in buying, there is little of importance stirring in the imported wood pulp trade. The market is feeling the effects of the same conditions governing the domestic pulp trade, and aside from occasional transactions, seldom involving other than fair-sized tonnage, business is very nearly entirely held in abeyance. Consumers in the United States, presumably not being in immediate need of supplies, show scant disposition to buy, and even offerings at attractive concessions in price frequently fail to bring out buyers.

Importers on the whole seem to evince a firmer attitude in regard to prices than do domestic pulp producers and dealers. The chief reason for this, it is said, is that quotations at primary sources remain comparatively high, which in itself makes importers here cautious about entering into commitments at lower prices as well as causing most of the supply on this side to be held with a fair degree of firmness.

Reports relative to conditions in Scandinavia are contradictory; that is, in regard to supplies of pulp available in those countries. All advices agree that manufacturing and general business conditions in both Norway and Sweden are bad, that demand for pulp from European sources has materially decreased, that manufacturers—particularly in Sweden—have reduced their production, and that prices are holding up fairly well. As concerns available stocks, some reports say that Norwegian and Swedish mills for the most part have contracted for nearly all their output for the balance of the year, whereas New York importers who have recently returned from Europe state that plenty of sulphite is to be had in Scandinavia provided buyers here will pay the prices asked. There seems no question that British papermakers have let up in their buying of pulp in Norway and Sweden, as have also French, Italian and other manufacturers. Moreover, the probabilities are a good portion of the orders Scandinavian pulp mills had booked several months ago have been cancelled. This would lead to the belief that a great deal more supply is available to American buyers, although importers assert that prices are being held up close to the levels prevailing during the latter part of 1920 when the market abroad was considerably more active.

Importations at the port of New York dropped off to almost nothing in January, only a few thousand bales coming in. It is understood that fairly large shipments arrived at Philadelphia and Baltimore, but the light imports at New York clearly reflected the dull position of the market.

Receipts at New York in January and current quotations on an ex dock basis follow:

Bleached sulphite	$ 8.50– 9.00
Unbleached sulphite, No. 1	6.25– 6.75
Easy bleaching	7.00– 7.50
Mitscherlich unbleached	7.50– 8.00
Kraft	5.25– 5.75
Ground wood, per ton	75.00– 80.00

Mitsui & Co., 800 bls. from Kobe; Scandinavian-American Trading Co., 6,300 bls. from Hernosand, and 12,956 bls. from West Hartlepool; American Woodpulp Corp., 5,400 bls. from Hernosand; National Bank of Commerce, 1,600 bls. from Trondhjem; Tidewater Paper Mills Co., 7,412 bls. ground wood from Liverpool, N. S.

Paper Stock

Judging from the amounts of stock arriving at the port of New York during January, the United States' trade in foreign papermaking materials has come to virtually a halt temporarily. Receipts declared through the New York customs district very nearly reached the vanishing point last month, there being but trifling quantities of rags, old rope, bagging and other paper stock brought in. This doubtless can be taken as reflecting the dullness obtaining in the papermaking materials market in this country in recent weeks, and also the relatively lower prices ruling on domestic stock which evidently discourage importers from making purchases in Europe.

It stands to reason that with America buying but small quantities of paper stock in European countries that accumulations must be piling up abroad, especially in view of the fact that the United States has been the principal outlet for such material since the war. At the same time, importers declare that European dealers are quoting prices substantially above a parity with present values of domestic stock and that in numerous cases they seem satisfied to wait out the market in the firm belief that prices will advance on this side in the near future. Another factor which tends to restrict trading is that of exchange. Most exchanges on European countries are rising and this serves to raise prices on goods bought from those nations.

Importations of papermaking rags at New York last month totalled less than 3,000 bales, which is the smallest month's receipts probably for any month since the war. Only a few hundred bales of old rope and bagging came in, while imports of miscellaneous paper stock amounted to but about a thousand bales. Receipts at New York in January were as follows:

Old Rope

Adams Bag Co., 98 bls. from Glasgow and 435 coils from Rotterdam; Brown Bros. & Co., 176 bls. from Havre; Old Colony Trust Co., 126 coils from Bristol; Irving National Bank, 121 bls. from Barcelona.

Old Bagging

New Netherland Bank, 457 bls. from Havre; Equitable Trust Co., 509 bls. from Havre; Edwin Butterworth & Co., 95 bls. from Genoa; Order, 350 bls. from Antwerp.

Rags

Equitable Trust Co., 316 bls. from Antwerp; Irving National Bank, 603 bls. from Antwerp and 107 bls. from Glasgow; Mechanics & Metals National Bank, 39 bls. from Antwerp; Ladenburg, Thalman & Co., 346 bls. from Antwerp and 156 bls. from Hamburg; Cie Generale Trans, 266 bls. from Antwerp; Paterson Parchment Paper Co., 25 bls. from Rotterdam; W. Van Doorn, 54 bls. from Rotterdam; Goldman, Sachs & Co., 608 bls. from Havre; Excel Remnants Co., 35 bls. from Rotterdam; Jaffe & Co., 36 bls. from Rotterdam; Maurice O'Meara Co., 86 bls. from Havre; R. Goldstein & Son, 10 bls. from Antwerp; Order, 294 bls. from Havre, 25 bls. from Liverpool and 43 bls. from Buenos Aires.

Miscellaneous Paper Stock

E. J. Keller Co., 28 bls. from Glasgow and 138 bls. from Antwerp; Castle, Gottheil & Overton, 166 bls. from London; Wilkinson Bros. & Co., 78 bls. from Genoa; Old Colony Trust

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PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 48 inches.

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DURABLE—ECONOMICAL—EASY TO INSTALL

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A. Wyckoff & Son Company

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Co., 59 bls. from Antwerp; A. Katzenstein, 578 bls. from Antwerp; Order, 171 bls. from Antwerp.

Paper

The receipt of news print from Germany continues to feature the United States' import trade in paper. During January approximately 21,000 rolls of news print, the great bulk of which came from Hamburg, was declared through the New York customs office, which although being considerable less than the tonnage received during the previous month, shows that comparatively large amounts of print paper are being imported.

Arrivals of strawboard from Germany continue moderately heavy, and the customary amounts of cigarette paper from France, and wrapping, filter and hanging papers from European countries were brought in last month. Imports at New York in January follow:

Cigarette

Rose & Frank Co., 48 cs. from Havre; American Tobacco Co., 295 cs. from Havre and 100 cs. from Bordeaux; Surbrug Co., 31 cs. from Havre; P. Lorillard Co., 37 cs. from Havre; Southern Pacific Co., 3 cs. from Havre; J. Jarakian & Son, 10 cs. from Constantinople; J. Victori & Co., 7 cs. from Barcelona; F. B. Vandegrift & Co., 4 cs. from Barcelona; Bankers Trust Co., 66 cs. from Genoa; B. F. Teale, 116 cs. from Porto Neixoes; British-American Tobacco Co., 50 cs. from Liverpool; Heidelbach, Ickelheimer & Co., 30 cs. from Porto Neixoes; R. J. Reynolds Tobacco Co., 1,260 cs. from Bordeaux.

Printing

Chase National Bank, 1,156 rolls from Hamburg; National City Bank, 221 rolls from Hamburg, 361 rolls from Gothenburg, 260 rolls from Helsingfors and 883 rolls from Kotka; Knauth, Nachod & Kuhne, 510 rolls from Hamburg and 12 bls. from Trondhjem; States Forwarding & Shipping Co., 9 cs. from Hamburg; American Express Co., 1,615 rolls from Hamburg; Equitable Trust Co., 735 rolls from Hamburg; Globe Shipping Co., 109 cs. from Hamburg; J. F. Patton & Co., 2,038 rolls from St. Johns; W. Van Doorn, 43 pkgs. from Rotterdam; Seaman Paper Co., 250 rolls from St. Johns; Columbia Trust Co., 294 rolls from Rotterdam; H. Lips, 75 cs. from Marseilles; Atlantic National Bank, 71 cs. from Hamburg; B. F. Drakenfeld & Co., 72 cs. from Liverpool; Oxford University Press, 9 cs. from Liverpool; W. F. Etherington, 24 cs. from Glasgow; T. Nevin, 4 cs. from London; H. Reeve Angel & Co., 51 rolls from Helsingfors, 231 rolls from Kotka and 4 cs. from Glasgow; Irving National Bank, 707 rolls from Gothenburg; F. Henjes, Inc., 6 cs. from Hamburg; National Bank of Commerce, 229 rolls from Antwerp; American Transmarine Co., 616 rolls from Hamburg; E. Dietzgen & Co., 25 cs. from Hamburg; Steiner Paper Co., 26 cs. from Hamburg; Union Alliance Corp., 1,985 rolls from Norrkopsing; Pulp & Paper Trading Co., 340 rolls from Hamburg; Harriman National Bank, 560 rolls from Hamburg; Order, 337 rolls from Christiania, 182 rolls from Gothenburg, 2,230 rolls from Helsingfors, 1,728 rolls from Hango, 1,023 rolls from Kotka, 1,151 rolls from Fredrikswald, 321 rolls from Antwerp, 214 rolls from Christiansand and 478 rolls from Hamburg.

Wrapping

Irving National Bank, 101 bls. from Antwerp; Maurice O'Meart Co., 429 rolls from Helsingfors; Schenken & Co., 247 bls. from Hamburg; Birn & Wachenheim, 140 bls. from Rotterdam; Henry Lindenmeyr & Sons, 28 pkgs. from Rotterdam; R. Cushman & Co., 3 cs. from Genoa; Atlantic National Bank, 82 cs. from Hamburg; Republic Bag & Paper Co., 468 rolls from Hamburg; Knauth, Nachod & Kuhne, 3 cs. from Hamburg; Bernard, Judae & Co., 4 bls. from Hamburg; S. S. Alcorn, 13 bls. from Hamburg; Order, 146 bls. from Hamburg and 16 cs. from Piraëus.

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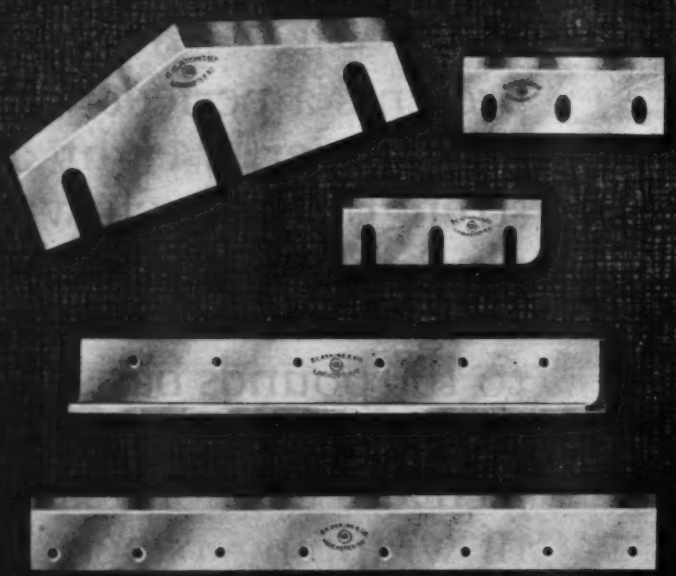

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Writing

E. Robelin, 16 cs. from Havre; H. W. Robinson & Co., 4 cs. from Liverpool; Order, 2 cs. from Rotterdam and 1 cse. from London.

Hanging

Transit Trading Co., 101 rolls from Hamburg; W. H. S. Lloyd & Co., 32 bls. from London; R. F. Lang, 10 bls. from London; A. Murphy & Co., 10 bls. from London; Prager Co., 461 bls. from Antwerp and 1 cse. from Havre; R. F. Downing & Co., 26 cs. from London; A. C. Dodman, Jr., 81 bls. from Liverpool; R. C. Fritz, 915 bls. from Antwerp and 153 rolls from Hamburg; M. L. Eckstein, 2 cs. from Hamburg; Interocean Forwarding Co., 2 cs. from Liverpool; Order, 1 cse. from London.

Filter

Lunham & Moore, 29 cs. from London; E. M. Sergeant & Co., 12 cs. from Gothenburg; Hummel & Robinso, 8 cs. from Rotterdam; Rohde Laboratory Supply Co., 6 cs. from Rotterdam; National City Bank, 29 cs. from Rotterdam; F. Bertolli & Co., 3 cs. from Marseilles; Druggist Supply Co., 18 cs. from Bordeaux.

Drawing

Lunham & Moore, 25 cs. from London; R. W. Greff & Co., 31 cs. from Trieste; Keuffel & Esser Co., 149 cs. from Hamburg.

Boards

Phoenix Shipping Co., 7 cs. from Hamburg; Bernard, Judae & Co., 2 cs. from Hamburg; Transatlantic Shipping Co., 17 cs. from Hamburg; National City Bank, 224 rolls from Rotterdam; Henry Lindenmeyr & Sons, 287 rolls from Rotterdam; Guaranty Trust Co., 206 pkgs. from Rotterdam and 75 rolls from Hamburg; W. Van Doorn, 1,760 pkgs. from Rotterdam; C. W. Rider & Co., 2,436 rolls from Antwerp; Pulp & Paper Trading Co., 167 rolls from Rotterdam; Riegel & Co., 765 rolls from Rotterdam; F. B. Vandegrift & Co., 10 cs. from Antwerp; G. F. Meissner, 23 cs. from Hamburg; Foreign Paper Mills, Inc., 55 cs. from Rotterdam; Columbia Corrugated Co., 374 rolls from Rotterdam; Lincoln Trust Co., 53 rolls from Rotterdam; Kny, Scheerer Corp., 5 cs. from Hamburg; Meckelburg Specialty Co., 10 cs. from Hamburg; Order, 207 rolls from Rotterdam.

Miscellaneous

E. R. Darrell & Co., 2 cs. from Barbados; C. Montgolfer, 13 cs. from Havre; T. B. Starr, 7 cs. from Havre; Japan Paper Co., 31 cs. from Havre, 69 cs. from Yokohama, 1 cse. from London and 48 cs. from Genoa; Bendix Paper Co., 39 bls. from Hamburg; J. Sanford, 9 cs. from Antwerp; American Express Co., 3 cs. from Hamburg; R. F. Downing & Co., 2 cs. from London; Van Oppen & Co., 2 cs. from London; Lambert & Sons, 2 cs. from Havre; Black, Starr & Frost, 2 cs. from Havre; E. Bennecke & Bros., 75 cs. from Canton; Milwaukee Lace Paper Co., 24 cs. from Rotterdam; New York Label & Box Works, 7 cs. from Rotterdam; R. Reiner, Inc., 24 cs. from Rotterdam; F. B. Vandegrift & Co., 12 cs. from Hamburg; Globe Shipping Co., 6 cs. from Hamburg; National City Bank, 88 cs. from Hamburg; Ault & Wiborg Co., 25 cs. from Hong Kong; Herrmann Paper Co., 30 bls. from Hamburg; Berger & Wirth, 13 cs. from Hamburg; H. D. Catty & Co., 3 cs. from Hamburg; L. A. Consmiller, 126 cs. from Rotterdam; Henry Lindenmeyr & Sons, 18 bls. from Rotterdam; T. S. Emmerich & Co., 2 cs. from Havre; J. Buedingen, 2 cs. from Havre; E. Dietzgen & Co., 6 cs. from Hamburg; Hunt & Co., 2 pkgs. from Gothenburg; L. Mundet & Co., 10 cs. from Lisbon; National City Bank, 8 cs. from Hamburg; P. Puttmann, 208 cs. from Antwerp; H. W. Robinson & Co., 2 cs. from Havre; P. J. Coenca, 2 cs. from Havre; Gimbel Bros., 2 cs. from Havre; Order, 97 bls. from Antwerp, 2 bls. from Liverpool and 20 cs. from Hong Kong.

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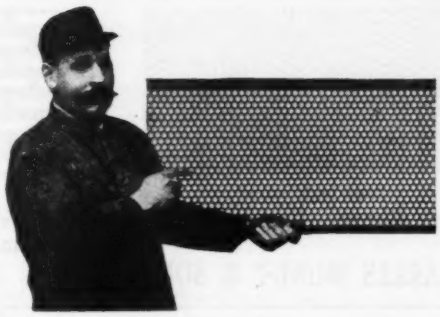

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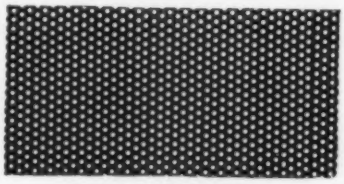

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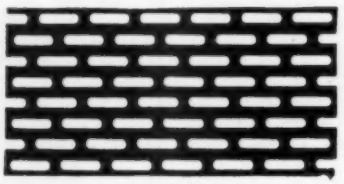
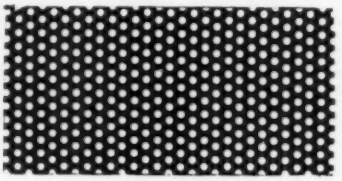


⅛ x ½" Slots



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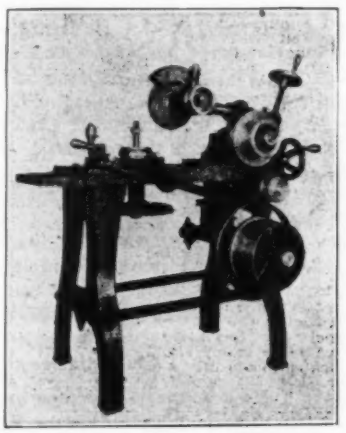

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Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

ADHESIVES
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

ACID RESISTING BRONZE
Sandusky Foundry & Machine Co., Sandusky, Ohio.
William A. Hardy & Sons, Fitchburg, Mass.

ACID RESISTING PAINT
Detroit Graphite Co., 503 12th St., Detroit, Mich.

AGITATOR EQUIPMENT
The Hill Clutch Co., Cleveland, Ohio.
Moore & White Co., Philadelphia, Pa.

AIR CONDITIONING AND CONTROL APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

ALKALI
Diamond Alkali Co., Pittsburgh, Pa.
Wing & Evans, 22 William St., N. Y. C.

ANGLE VALVES
The Crane Company, Chicago, Ill.

ARCHITECTS
James L. Carey, 208 N. Laramie St., Chicago.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
George F. Hardy, 309 Broadway, New York City.

ASH CONVEYORS
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

ASH HANDLING SYSTEMS
Jeffrey Manufacturing Co., Columbus, O.

ASSORTING TABLES
Moore and White Co., Philadelphia, Pa.

AUDITORS
Morris Rosenblum, 51 Liberty St., N. Y. C.

AUTOMATIC COOKING CONTROL
Trimbey & Allen, Glens Falls, N. Y.

AUTO TRUCKS
The White Co., Cleveland, O.

BALING PRESSES
Ohio Cultivator Co., Belleville, O.

BALLS (Brass)
The Draper Mfg. Co., Port Huron, Mich.

BANDLESS ROLLS
Dayton Globe Iron Works, Dayton, O.
Valley Iron Works Co., Appleton, Wis.

BARKERS
Carthage Machine Co., Carthage, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.

BARK SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

BEATER BARS
John W. Bolton & Sons, Inc., Lawrence, Mass.

BEATER BED PLATES
John W. Bolton & Sons, Inc., Lawrence, Mass.

BEATER ROLL FILLING
John W. Bolton & Sons, Inc., Lawrence, Mass.

BEATING, WASHING AND BLEACHING ENGINES
Dayton Beater & Hoist Co., Dayton, Ohio.
Dayton Globe Iron Works, Dayton, O.
Holyoke Machine Co., Holyoke, Mass.
Noble & Wood Machine Co., Hoosick Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

BEATERS (Continuous)
Claflin Engineering Co., Lancaster, Ohio.

BELTING (Leather)
The Cleveland Oak Belting Co., 1239 W. 9th St., Cleveland, O.

BELT CONVEYORS
The Jeffrey Mfg. Co., Columbus, O.
Robins Conveying Belt Co., New York City.

BELT DRESSING
G. B. Stock Xylite Grease & Oil Co., Port Huron, Mich.

BELT DRIVES
The Hill Clutch Co., Cleveland, Ohio.
The Link Belt Co., Chicago, Ill.

BLEACHING POWDER
Pennsylvania Salt Mfg. Co., Philadelphia.

BLEACHING (Propellers)
Moore and White Co., Philadelphia, Pa.

BLOWERS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

BOARD MACHINES
Beloit Iron Works, Beloit, Wis.
Valley Iron Works, Appleton, Wis.

BOARDS
Auer & Twitchell, Inc., Philadelphia, Pa.
The C. L. La Boiteaux Co., Cincinnati, O.

BOILERS
J. F. Davis, Chicago.

BOILER ARCHES
McLeod & Henry Co., Troy, N. Y.
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

BOILER BAFFLES
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

BOILER FEEDER
The Farnsworth Co., Conshohocken, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.

BOILER SETTINGS
McLeod & Henry Co., Troy, N. Y.

BRASS WIRE CLOTH
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Lindsay Wire Weaving Co., Cleveland, Ohio.
W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

BRIMSTONE
Union Sulphur Co., 17 Battery Place, New York City.

BRONZE CASTINGS
Eastwood Wire Mfg. Co., Columbus, O.
Neenah Brass Works, Neenah, Wis.

BRONZE JACKETS
Sandusky Foundry & Machine Co., Sandusky, Ohio.

BUNDLING SYSTEMS
Signode System, Lake St., Chicago

CALENDERS
Beloit Iron Works, Beloit, Wis.
Holyoke Machine Co., Holyoke, Mass.

CALENDER DOCTORS
Ticonderoga Machine Works, Ticonderoga, N.Y.

CALENDER ROLLS
Holyoke Machine Co., Holyoke, Mass.
B. F. Perkins and Son, Inc., Holyoke, Mass.

CASEIN
The Kalbfleisch Corp., 31 Union Square, N. Y. C.

CAST IRON PIPE
U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

CAUSTIC SODA
Diamond Alkali Co., Pittsburgh, Pa.

CAUSTICIZING APPARATUS
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

CENTRIFUGAL PUMPS
American Steam Pump Co., Battle Creek, Mich.
Buffalo Steam Pump Co., Buffalo, N. Y.
The Earle Gear & Machine Co., Philadelphia, Pa.
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

CHAIN BLOCKS
Yale & Towne Mfg. Co., Stamford, Conn.

CHEMICALS
Diamond Alkali Co., Pittsburgh, Pa.
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
The Grasselli Chemical Co., Cleveland, Ohio.
A. Klipstein & Co., 644 to 652 Greenwich St., New York City.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

CHIP CRUSHERS
Carthage Machine Co., Carthage, N. Y.

CHIPPERS
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works Co., Appleton, Wis.

CHIPPER AND BARKER KNIVES
John W. Bolton & Sons, Inc., Lawrence, Mass.

CHIP SCREENS
Carthage Machine Co., Carthage, N. Y.

CIRCULAR KNIFE GRINDERS
Gibbs-Brower Co., New York City.

CLAYS AND FILLERS
Binney & Smith Co., 81 Fulton St., N. Y. C.
Daniel M. Hicks, 200 Fifth Ave., New York City.
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Miner-Edgar Co., 110 William St., N. Y. C.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

COAL BUNKERS
The Brownhoist Co., Cleveland, Ohio.
The Jeffrey Mfg. Co., Columbus, O.

COAL & ASH HANDLING SYSTEMS
The Jeffrey Mfg. Co., Columbus, O.
Link Belt Co., Chicago.

COATED PAPERS
Bardeen Paper Co., Otsego, Mich.
Bermingham & Prosser, Chicago, Ill.
Seaman Paper Co., Chicago, Ill.

COMBUSTION ENGINEERS
The Engineer Co., 17 Battery Place, N. Y. C.

CONSISTENCY REGULATOR
Trimbey & Allen, Glens Falls, N. Y.

CONSTRUCTION (Building)
Casper Ranger Construction Co., Holyoke, Mass.

CONSULTING ENGINEERS
James L. Carey, 208 N. Laramie St., Chicago, Ill.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
George F. Hardy, 309 Broadway, New York City.

CONSULTING ENGINEERS (Power)
B. M. Baxter, Kirby Bldg., Cleveland.
H. B. Prather, 5716 Euclid Ave., Cleveland.

CONVEYORS
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Robins Conveying Belt Co., New York City.

CONVEYORS (Coal and Ash)
Jeffrey Manufacturing Co., Columbus, O.

CORES (Paper)
Auer & Twitchell, Inc., Philadelphia, Pa.

COTTON LINTERS
Dallas Waste Mills, 130 Pearl St., New York City.

CRANES
The Brownhoist Co., Cleveland, Ohio.
John F. Byers Co., Ravenna, Ohio.
Northern Engineering Works, Detroit, Mich.
The Link Belt Co., Chicago, Ill.
McMyler Interstate Co., Bedford, Ohio.
Whiting Corporation, Harvey, Ill.

CRUSHERS (Coal)
The Jeffrey Mfg. Co., Columbus, O.

CYLINDER MOLDS
Appleton Wire Works, Appleton, Wis.
Beloit Iron Works, Beloit, Wis.
Cheney Bigelow Wire Works, Springfield, Mass
Eastwood Wire Mfg. Co., Belleville, N. J.
Glens Falls Machine Works, Glens Falls, N. Y.
The Lindsay Wire Weaving Co., Cleveland, O.
The W. S. Tyler Co., Cleveland, Ohio.

DANDY ROLLS
Appleton Wire Works, Appleton, Wis.
Central Mfg. Co., Kalamazoo, Mich.
Cheney Bigelow Wire Works, Springfield, Ohio
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, Ohio.
The W. S. Tyler Co., Cleveland, Ohio.

DECKEL FRAME SUPPORTS
Huband & Nash, Menasha, Wis.

DIGESTERS
Technical Products Co., 501 Fifth Ave., N. Y. C.

DRUM WINDERS
Beloit Iron Works, Beloit, Wis.
Ticonderoga Machine Co., Ticonderoga, N. Y.

DRYER FELTS
Appleton Woolen Co., Appleton, Wis.
Fitchburg Duck Mills, Fitchburg, Mass.
F. C. Huyck & Sons.
Shuler and Benninghofen, Hamilton, Ohio.

DYNAMOS
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

The Noble & Wood Machine Co.

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Carthage New York

Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

DYESTUFFS
Binney & Smith, 81-83 Fulton St., N. Y. City.
E. I. Du Pont de Nemours & Co., Wilmington, Del.
Geigy Co., Inc., 89 Barclay St., New York City.
National Aniline & Chem. Co., 21 Burling Slip, New York City.
The Newport Chemical Works, Inc., Passaic, N. J.
The White Tar Aniline Corp., 56 Vesey St., New York City.

DUST COLLECTING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

ELECTRIC HOISTS
John F. Byers Machine Co., Ravenna, Ohio.
Link-Belt Co., Chicago, Ill.
Northern Engineering Co., Detroit, Mich.

ELECTRIC MACHINERY
Westinghouse Elec. & Mfg. Co. East Pittsburgh, Pa.

ELEVATORS
The Jeffrey Mfg. Co., Columbus, O.

ELEVATORS (Portable)
The Jeffrey Mfg. Co., Columbus, O.

ELEVATOR PUMPS
Earle Gear & Machine Co., Philadelphia, Pa.

ENGINES
The Brownell Co., Dayton, O.
Chandler and Taylor, Indianapolis, Ind.
Erie Ball Engine Co., Pittsburgh, Pa.
Kansas City Machine Works, Kansas City, Mo.

ENGINEERS
B. M. Baxter, 5716 Euclid Ave., Cleveland, O.
James L. Carey, 208 North Laramie St., Chicago, Ill.
George F. Hardy, 309 Brodway, New York City.
Hardy S. Ferguson, 200 Fifth Ave., New York City.
Management Engineering and Development Co., Dayton, O.
H. B. Prather, Kirby Bldg., Cleveland, O.
Stebbins Engineering & Mfg. Co., Watertown, N. Y.

EVAPORATORS:
Charles Ordway, 25 Church St., N. Y. City.
Swenson Evaporator Co., Chicago, Ill.
Zaremba Co., Buffalo, N. Y.

EXHAUSTERS
Glamorgan Pipe & Foundry Co., Lynchburg, Va.

FANS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

FELTS AND JACKETS
Appleton Woolen Co., Appleton, Wis.
Fitchburg Duck Mills, Fitchburg, Mass.
F. C. Huyck & Sons, Albany, N. Y.
Lockport Felt Co., Newfane, N. Y.
Paper Trading Co., Boston, Mass.
Shuler and Benninghofen, Hamilton, Ohio.

FELT CLEANERS
G. B. Stock Grease & Oil Co., Port Huron, Mich.

FELT ROLLS
Rodney Hunt Machine Co., Orange, Mass.

FELT AND WIRE GUIDES
Huband and Nash, Menasha, Wis.
Moore & White Co., Philadelphia, Pa.

FIBROUS PEARL FILLER
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

FILTER (Continuous Suction)
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Oliver Continuous Filter Co., Los Angeles, Calif.

FILTERS (Pressure and Gravity)
Graver Corporation, East Chicago, Ind.
Hungerford & Terry, Inc., Philadelphia, Pa.

FIRE BRICK (Plastic)
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

FIRE PUMPS
Earle Gear & Machine Co., Philadelphia, Pa.

FLOORING
Jennison-Wright Co., Toledo, Ohio.

FLUID METERS
Bailey Meter Co., 2023 E. 46th St., Cleveland, Ohio.

FOURDRINIER WIRES
Appleton Wire Works, Appleton, Wis.
Cheney Bigelow Wire Works, Springfield, Mass.
Eastwood Wire Mfg. Co., Belleville, N. J.
Lindsay Wire Weaving Co., Cleveland, Ohio.
The W. S. Tyler Co., Cleveland, Ohio.
Wisconsin Wire Works, Appleton, Wis.

FRICTION CLUTCHES
The Hill Clutch Co., Cleveland, Ohio.
Moore and White Co., Philadelphia, Pa.

FURNACE ARCHES
McLeod & Henry Co., Troy, N. Y.

GEARS
The Hill Clutch Co., Cleveland, Ohio.
Earle Gear & Machine Co., Philadelphia, Pa.
Wm. Ganschow Co., Chicago.

GLUES
E. F. Russ Co., 201 Devonshire St., Boston, Mass.

GRATE BARS
Cyclone Grate Bar Co., Buffalo, N. Y.
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

GREASES
G. B. Stock Xylite Grease & Oil Co., Port Huron, Mich.

GRINDERS
The Bagley & Sewall Co., Watertown, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Holyoke Machine Co., Holyoke, Mass.
Union Iron Works, Bangor, Me.
Valley Iron Works, Appleton, Wis.

HOISTING AND CONVEYING SYSTEMS
John F. Byers Machine Co., Ravenna, Ohio.
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago, Ill.
Northern Engineering Co., Detroit, Mich.
Robins Conveying Belt Co., New York City.

HYDRAULIC TURBINES
Dominion Engineering Works, Ltd., Montreal, Quebec.
Holyoke Machine Co., Holyoke, Mass.
James Leffel and Co., Springfield, Ohio.
S. Morgan Smith Co., York, Pa.

INDUSTRIAL
The Nashville Industrial Corp., Jacksonville, Tenn.

INSTRUMENTS (Fluid Meter)
Bailey Meter Co., 2023 E. 46th St., Cleveland, Ohio.

IRON CASTINGS
Beloit Iron Works, Beloit, Wis.
Valley Iron Works Co., Appleton, Wis.

JORDAN FILLINGS
J. W. Bolton & Sons, Inc., Lawrence, Mass.

KNIVES
E. C. Atkins & Co., Indianapolis, Ind.
John W. Bolton & Sons, Inc., Lawrence, Mass.

LAYBOYS
Moore and White Co., Philadelphia, Pa.

KNIFE GRINDING MACHINERY
Machinery Co. of America, Big Rapids, Mich.

LINE SHAFT BEARINGS
The Hill Clutch Co., Cleveland, Ohio.

MACHINE DRYER TEMP. CONTROL
Open Coil Heater and Purifier Co., Indianapolis, Ind.

MECHANICAL DRAFT APPARATUS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

MECHANICAL PULP
J. Andersen & Co., 21 E. 40th St., New York City.

MECHANICAL STOKERS
Sanford Riley Stoker Co., Worcester, Mass.

METAL PROTECTIVE PAINT
Detroit Graphite Co., 503 12th St., Detroit, Mich.

METERS (Fluid)
Bailey Meter Co., 2023 E. 46th St., Cleveland, Ohio.

MILL ARCHITECTS
Stebbins Engineering & Mfg. Co., Watertown, N. Y.

MILL WRAPPERS
Auer & Twitchell, Inc., Philadelphia, Pa.

MIXING SYSTEM
Trimbey & Allen, Glens Falls, N. Y.

MILL WHITE
Detroit Graphite Co., 503 12th St., Detroit, Mich.
Tropical Paint & Oil Co., Cleveland, Ohio.
Vortex Mfg. Co., Cleveland, Ohio.

MOTORS
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

PAINTS
Detroit Graphite Co., Detroit, Mich.
The Tropical Paint & Oil Co., Cleveland, O.
Vortex Mfg. Co., Cleveland, Ohio.

PAINT GUN
Vortex Mfg. Co., Cleveland, Ohio.

PAPER BOARDS
The C. L. La Boiteaux Co., 200 Fifth Ave., N. Y.

PAPER CUTTERS & SLITTERS
Beloit Iron Works, Beloit, Wis.
Hamblet Machine Co., Lawrence, Mass.

PAPER DISTRIBUTORS
Bermingham and Prosser, Chicago, Ill.
H. G. Craig & Co., New York City.
Berton C. Hill Co., New York City.
Maurice O'Meara, New York City.
Sabin Robbins Paper Co., Middletown, O.
Seaman Paper Co., Chicago, Ill.

PAPER EXPORTERS AND IMPORTERS
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Main Paper Stock Co., 23-31 Peck Slip, New York City.
New York Overseas Co., 17 Battery Place, New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.
Storm & Bull, 114 Liberty St., New York City.

PAPER MACHINES
The Bagley & Sewall Co., Watertown, N. Y.
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, O.
Dominion Engineering Works, Ltd., Montreal, Quebec.

PAPER MANUFACTURERS
Bardeen Paper Co., Otsego, Mich.
Eastern Manufacturing Co., 501 Fifth Ave., N. Y. City.
Hammermill Paper Co., Erie, Pa.
Lincoln Paper Mills, Elkhart, Ind.
Marathon Paper Co., Rothschild, Wis.
Munising Paper Co., Munising, Mich.
Northern Paper Mills, Green Bay, Wis.
Oxford Paper Co., 200 Fifth Ave., N. Y. City.
Wausau Sulphate Fibre Co., Mosinee, Wis.
Wolverine Paper Co., Otsego, Mich.

PAPER MANUFACTURERS' SUPPLIES
J. Andersen & Co., 21 East 40th St., New York City.
Craig-Becker Co., 52 Vanderbilt Ave., N. Y. City.
Dallas Waste Mills, 130 Pearl St., New York City.
Detroit Chemical Works, Detroit, Mich.
Diamond Alkali Co., Pittsburgh, Pa.
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Invincible Paper & Pulp Corporation, 135 Broadway, N. Y. City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
Leshner Paper Stock Co., Hamilton, Ohio.
Mendelson Bros. Paper Stock Co., 910 Michigan Ave., Chicago.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Paper Makers' Chemical Co., St. Austell England.
Paper Trading Co., Boston, Mass.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
A. Salomon, Inc., New York City.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

PAPER MILL BROKERS
Gibbs-Brower Co., 261 Broadway, N. Y. C.

PAPER STOCK CUTTERS
Taylor, Stiles & Co., Riegelsville, N. J.

PAPER AND PULP MILL MACHINERY
Beloit Iron Works, Beloit, Wis.
The Black-Clawson Co., Hamilton, O.
The Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.

PARCHMENT MANUFACTURERS
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.

The Sandy Hill Iron & Brass Works

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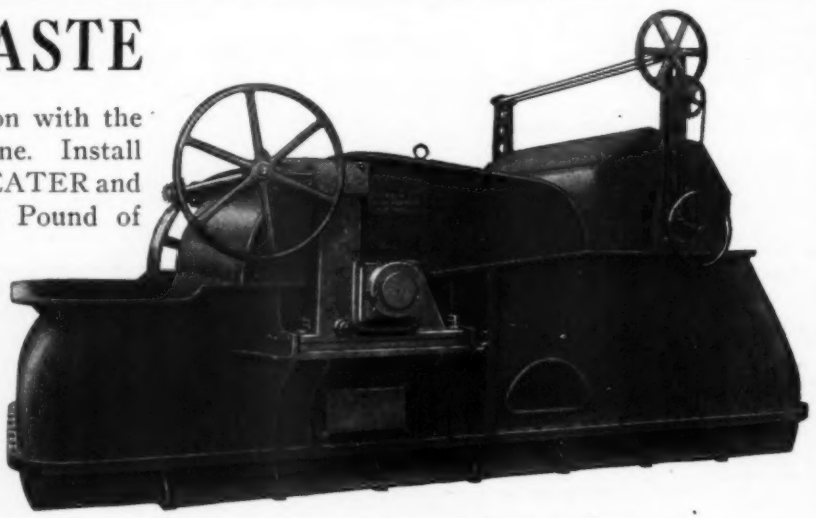

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Buyers' Guide—What and Where to Buy

Equipment, Apparatus, Supplies and Raw Materials Used by the Paper Industry

PERFORATED METALS
Harrington & King Perforating Co., 615 No. Union Ave., Chicago.
Charles Mundt & Sons, 57 Fairmount Ave., Jersey City, N. J.

PIPE BENDING
American Pipe Bending Co., Boston, Mass.

PIPING EQUIPMENT
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.

PIPING SYSTEMS INSTALLED
Pittsburgh Piping & Equip. Co., Pittsburgh, Pa.

PIPE THREADING & CUTTING MACHINERY
Toledo Pipe Threading Machine Co., Toledo, O.

PLUG MACHINES
Carthage Machine Co., Carthage, N. Y.

PNEUMATIC CHIP HANDLING SYSTEMS
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

POWER TRANSMISSION
Dodge Sales & Engineering Co., Mishawaka, Ind.
Link-Belt Co., Chicago, Ill.
The Hill Clutch Co., Cleveland, Ohio.
Rodney Hunt Machine Co., 45 Mill St., Orange, Mass.
Valley Iron Works, Williamsport, Pa.

PRESS ROLLS
Rodney Hunt Machine Co., Orange, Mass.

PULP (Chemical)
J. Andersen & Co., 21 East 40th St., New York City.
Craig-Becker Co., 52 Vanderbilt Ave., N. Y. City.
M. Gottesman & Co., 18 E. 41st St., New York City.
Daniel M. Hicks, 200 Fifth Ave., New York City.
E. J. Keller Company, 200 Fifth Ave., N. Y. C.
New York Overseas Co., Inc., 17 Battery Place, New York City.
Price & Pierce, Ltd., 30 East 42nd St., New York City.
The Pulp & Paper Trading Co., 21 East 40th St., New York City.
Scandinavian-American Trading Co., 50 East 42d St., New York City.
Lagerloef Trading Co., 18 E. 41st St., N. Y. C.

PULP AND PAPER MACHINERY
Beloit Iron Works, Beloit, Wis.
Carthage Machine Co., Carthage, N. Y.
Frank H. Davis Co., Cambridge, Mass.
Glens Falls Machine Co., Glens Falls, N. Y.
Moore & White Co., Philadelphia, Pa.
Noble & Woods Machine Co., Hoosick Falls, N. Y.
Union Iron Works, Bangor, Me.
Valley Iron Works, Appleton, Wis.

PULP GRINDERS
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Union Iron Works, Bangor, Me.

PULP MILL BROKERS
Gibbs-Brower Co., 261 Broadway, N. Y. C.

PULP LAP SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

PULP SHREDDERS
Carthage Machine Co., Carthage, N. Y.

PUMPS (Stock)
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Co., Glens Falls, N. Y.

PUMPS (Centrifugal)
American Steam Pump Co., Battle Creek, Mich.
Earle Gear & Machine Co., Philadelphia, Pa.

PUMPS (Deep Well)
Gregg Pump Co., Kansas City, Mo.

PUMPS (Vacuum)
American Steam Pump Co., Battle Creek, Mich.
Dean Bros., Indianapolis, Ind.

RAG AND PAPER DUSTERS
Holyoke Machine Co., Holyoke, Mass.

RAG CUTTERS
B. F. Perkins & Son, Inc., Holyoke, Mass.

ROTARY VACUUM PUMPS
Sandusky Foundry & Machine Co., Sandusky, O.

RUBBER ROLLS
The American Wringer Co., Woonsocket, R. I.

SAVE-ALLS
Glens Falls Machine Co., Glens Falls, N. Y.

SAWS
E. C. Atkins & Co, Indianapolis, Ind.
Simonds Manufacturing Co., Fitchburg, Mass.
Earle Gear & Machine Co., Philadelphia, Pa.

SECOND HAND MACHINERY
Technical Products Co., 501 Fifth Ave., N. Y. C.

SCREENS
The Bagley & Sewall Co., Watertown, N. Y.
Shartle Bros. Mach. Co., Middletown, O.
Union Iron Works, Bangor, Me.

SCREEN PLATES
Central Mfg. Co., Kalamazoo, Mich.
William A. Hardy & Sons, Fitchburg, Mass.
Union Screen Plate Co., Fitchburg, Mass.

SHOWER PIPES
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SILENT CHAIN DRIVES
The Link Belt Co., Chicago, Ill.

SIZING SYSTEMS
Eastern Paper Makers' Chemical Co., Watertown, N. Y.
Paper Makers' Chemical Co., Easton, Pa., and Holyoke, Mass.
Process Engineers, New York City.
Western Paper Makers' Chemical Co., Kalamazoo, Mich.

SLITTING GRINDERS
Gibbs-Brower Co., New York City.

SLITTING AND REWINDING MACHINERY
Beloit Iron Works, Beloit, Wis.
Cameron Machine Co., Poplar St., Brooklyn, N. Y.
Hamblet Machine Co., Lawrence, Mass.
Samuel M. Langston Co., Camden, N. J.
Meisel Press Mfg. Co., 948 Dorchester, Ave., Boston 25, Mass.

SOOT BLOWERS
Diamond Power Specialty Co., Detroit, Mich.
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

SODA ASH
Diamond Alkali Co., Pittsburgh, Pa.

SPEED CHANGES
Moore and White Co., Philadelphia, Pa.

SPEED REDUCERS
Wm. Ganchow Co., Chicago, Ill.

SPRAY NOZZLES
Buffalo Forge Co., Buffalo, N. Y.

STEAM TRAPS
L. S. Shaw & Co., 5716 Euclid Ave., Cleveland, O.

STOCK CIRCULATING SYSTEM
Claflin Engineering Co., Lancaster, Ohio.
Ticonderoga Machine Works, Ticonderoga, N.Y.

STOCK METER
Trimbey & Allen, Glens Falls, N. Y.

STOCK PUMPS
The Bagley & Sewall Co., Watertown, N. Y.
Beloit Iron Works, Beloit, Wis.
Buffalo Steam Pump Co., Buffalo, N. Y.

SUCTION ROLLS
Sandusky Foundry and Machine Co., Sandusky, Ohio.

SULPHITE MACHINERY
Stebbins Engineering Co., Watertown, N. Y.

SULPHITE PULP
Riordan Sales Co., Montreal, Canada.

SULPHUR
Union Sulphur Co., 17 Battery Place, New York City.

SULPHUR BURNERS
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

TRUCKS (Roll Handling)
The Elwell-Parker Elec. Co., Cleveland, Ohio.

TRUCKS (Industrial)
The Elwell-Parker Elec. Co., Cleveland, Ohio.

TURBINES (Hydraulic)
Rodney Hunt Machine Co., Orange, Mass.
James Leffel and Co., Springfield, Ohio.
S. Morgan Smith Co., York, Pa.

VACUUM PUMPS
Nash Eng. Co., South Norwalk, Conn.

VACUUM SYSTEMS
Open Coil Heater and Purifier Co., Indianapolis, Ind.

VALVES
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The Crane Co., Chicago, Ill.
G. M. Davis Regulator Co., 414 Milwaukee Ave., Chicago, Ill.
The Wm. Powell Co., Cincinnati, Ohio.

VALVES (Digester)
Neenah Brass Works, Neenah, Wis.

VAPOR ABSORPTION SYSTEMS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.

VARIABLE SPEED ENGINES
The Brownell Co., Dayton, Ohio.
Chandler and Taylor, Indianapolis, Ind.
Erie Ball Engine Co., Pittsburgh, Pa.

VENTILATING SYSTEMS
American Blower Co., Detroit, Mich.
Bayley Mfg. Co., 732 Greenbush St., Milwaukee, Wis.
B. F. Perkins & Son, Inc., Holyoke, Mass.
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WASHER WIRES
The W. S. Tyler Co., Cleveland, Ohio.

WASTE PAPER STOCK
Main Paper Stock Co., 23-31 Peck Slip, New York City.
Mendelson Bros. Paper Stock Co., 910 S. Michigan Blvd., Chicago, Ill.

WATCHMAN'S CLOCKS
Chicago Watchman's Clock Works, 1526 Wabash Ave., Chicago.
Hardinge Bros., Inc., 1771 Berteau Ave., Chicago, Ill.

WATER FILTER
Glens Falls Machine Co, Glens Falls, N. Y.
Hungerford & Terry, Inc., Philadelphia, Pa.

WATER POWER EQUIPMENT
Rodney Hunt Mach. Co., 45 Mill St., Orange, Mass.

WATERPROOF LINING
The National Waterproofing Co., Philadelphia, Pa.

WATER-SOFTENING AND PURIFYING SYSTEMS
Wm. B. Scaife and Sons Co., Oakmont, Pa.

WATER WHEELS
Rodney Hunt Machine Co., Orange, Mass.
James Leffel and Co., Springfield, Ohio.
Holyoke Machine Co., Holyoke, Mass.
S. Morgan Smith Co., York, Pa.

WET MACHINES
The Bagley & Sewall Co., Watertown, N. Y.
Carthage Machine Co., Carthage, N. Y.
Glens Falls Machine Works, Glens Falls, N. Y.
Valley Iron Works Co., Appleton, Wis.

WOOD BLOCKS
Jennison-Wright Co., Toledo, Ohio.

WOOD CHIP SHREDDERS
The Jeffrey Mfg. Co., Columbus, O.

WOOD PIPE
The Michigan Pipe Co., Dept. 17, Bay City, Mich.
A. Wyckoff & Son Co., Elmira, N. Y.

WOOD ROLLS
Rodney Hunt Mach. Co., 45 Mill St., Orange, Mass.

WOOD SPLITTERS
Carthage Machine Co., Carthage, N. Y.

WOOD WASHERS
Carthage Machine Co., Carthage, N. Y.

WIRE SIGNS
Cheney Bigelow Wire Works, Springfield, Mass.

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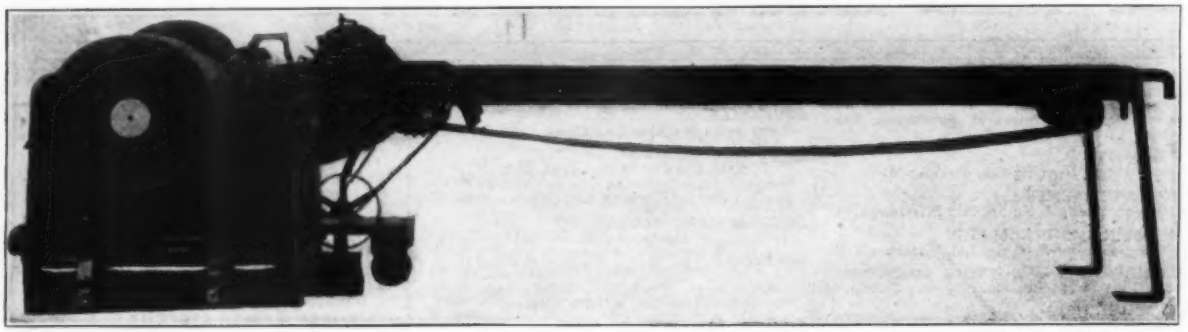

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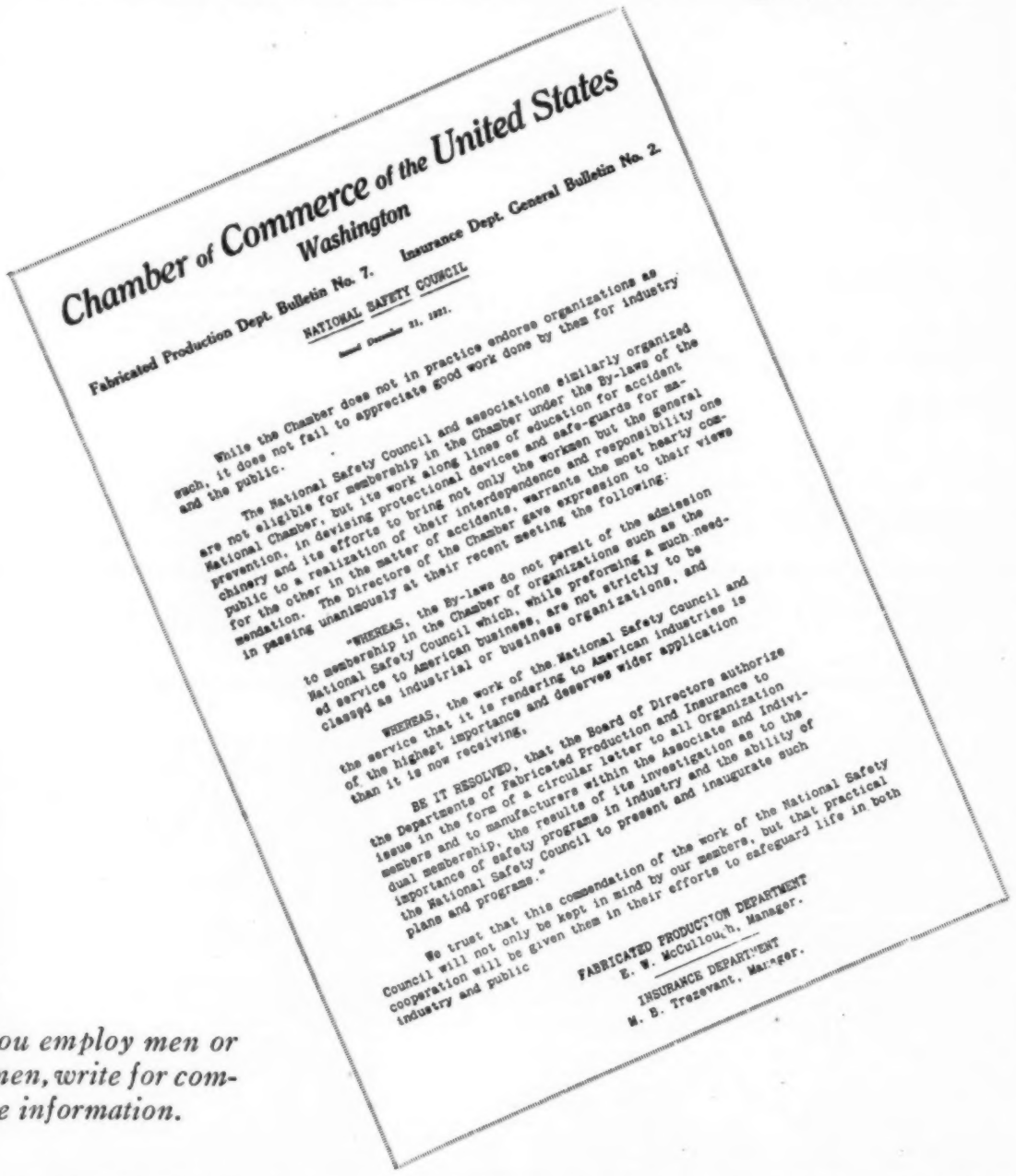
THE NATIONAL SAFETY COUNCIL is a co-operative, non-commercial association, consisting of more than 4,000 member companies—representing 6,000,000 workmen. Through its aid, member plants have been enabled to reduce accidents fifty to eighty per cent.



Chamber of Commerce of the United States
Washington

Fabricated Production Dept. Bulletin No. 7. Insurance Dept. General Bulletin No. 2.

NATIONAL SAFETY COUNCIL

Issued December 21, 1921.

While the Chamber does not in practice endorse organizations as such, it does not fail to appreciate good work done by them for industry and the public.

The National Safety Council and associations similarly organized are not eligible for membership in the Chamber under the By-laws of the National Chamber, but its work along lines of education for accident prevention, in devising protectional devices and safe-guards for machinery and its efforts to bring not only the workmen but the general public to a realization of their interdependence and responsibility one for the other in the matter of accidents, warrants the most hearty commendation. The Directors of the Chamber gave expression to their views in passing unanimously at their recent meeting the following:

"WHEREAS, the By-laws do not permit of the admission to membership in the Chamber of organizations such as the National Safety Council which, while preforming a such needed service to American business, are not strictly to be classed as industrial or business organizations, and

WHEREAS, the work of the National Safety Council and the service that it is rendering to American industries is of the highest importance and deserves wider application than it is now receiving,

BE IT RESOLVED, that the Board of Directors authorize the Departments of Fabricated Production and Insurance to issue in the form of a circular letter to all Organization members and to manufacturers within the Associate and Individual membership, the results of its investigation as to the importance of safety programs in industry and the ability of the National Safety Council to present and inaugurate such plans and programs."

We trust that this commendation of the work of the National Safety Council will not only be kept in mind by our members, but that practical cooperation will be given them in their efforts to safeguard life in both industry and public

FABRICATED PRODUCTION DEPARTMENT
E. W. McCullough, Manager.

INSURANCE DEPARTMENT
W. B. Treavant, Manager.

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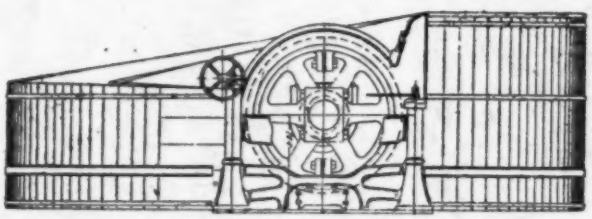

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